CRACOW LANDSCAPE MONOGRAPHS 2
Landscape as impulsion for culture:
research, perception & protection

LANDSCAPE IN THE PAST
& FORGOTTEN LANDSCAPES

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LANDSCAPE, LIVED EXPERIENCE AND POLITICAL ECOLOGY: 
SOME NOTES

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ABSTRACT
This paper engages with the diversity of recent theoretical approaches to the understanding of past landscapes. It comments on a number of different approaches – lived experience and phenomenology, political ecology and economy, as well as more traditional and culture-historical approaches. These different approaches have been seen as contradictory, and much ‘debate’ between them has been sharp and confrontational in tone and style. This paper suggests that apparent contradictions are, in part, a matter of analytical scale. It proposes an integrated approach to the understanding of landscape that decenters the claim of any one understanding to centre stage. I illustrate my comments with reference to recent fieldwork in and around the late medieval castle of Bodiam in south-eastern England.

Keywords
Landscape, lived experience, ecology, castles

1. INTRODUCTION AND BACKGROUND

In my keynote paper, I will discuss some of the different theoretical attitudes and approaches to landscape archaeology. My comments will have significance beyond the field of archaeology, as they bring in aspects of historical, anthropological and interdisciplinary work on landscapes as a whole.

As someone who self-identifies as a ‘theorist’ (Johnson 2010), I have for some time been thinking about the variety of approaches to landscape archaeology. My interest is not simply in the intellectual properties of different approaches, their strengths and weaknesses, but also in the nature of dialogue or debate between them. Specifically, why are some theoretical engagements with landscape so conflicted - why do different approaches to landscape make people so angry?

There are two responses to this question. First, landscapes are vehicles for so many other cultural ideas and formations, for example ideas of nation and volk, as well as gendered engagements with the land (Schama 1995). To question or to bring a critical attitude to landscape, then, is to probe at some dearly held conceptions of identity at a series of levels, from nationalism to masculinity. To probe landscape is to probe people’s souls.

A second, less obvious response is that engagement with the landscape can become complicit with a certain kind of vulgar empiricism in which the facts are held to speak for themselves (Johnson 2011). Field practice is central to any understanding of landscape, but field experience can too easily be vulgarized as raw experience. You can just go out and see landscape for yourself, without the need for an intervening theoretical language. A colour change in a test tube needs some kind of theoretical translation to get to the underlying chemical reaction. The wind, weather, rocks, mountains, fields are all too familiar, and (in this view) all too easily understood.
In my book *Ideas of Landscape* (Johnson 2007), I argued that these two responses – the cultural freight of attitudes towards landscape, and an underlying vulgar empiricism – were related. I argued that historically, they were linked as twin propositions of Romanticism. That book had quite a specific field and argument, engaging with English Romanticism and tracing its influence forward to the present in the ‘English landscape school’. However, with qualifications, much of the argument could be applied to other varieties of European landscape tradition.

In speaking of landscape, then, scholars confront a dense mass of attitudes and assumptions, and often they also encounter anger when they question some of those attitudes and assumptions. Two schools of thought in particular have provoked anger: those that foreground subjective experience, and those which foreground the environment. And anger is always revealing; it elicits enquiry into the source of the anger (Leone 2010).

A split between subjective experience on the one hand, and the environment on the other, has been deconstructed many times in the theoretical literature. Over and over again, scholars have defined and dismissed this split as a false opposition, borne of a shallow reading of different texts, or (as I did in *Ideas of Landscape*) seen this split as deriving from the underlying cultural assumptions of a vulgar Romanticism. However, the split persists at the level of rhetoric, of gut feeling, and of everyday as opposed to formal discourse.

In what follows, I want to explore traditions of lived experience and of environment not as either/or options, but rather as complementary. Indeed, I want to go further than this and think about some of the ways these approaches are mutually enabling.

2. LIVED EXPERIENCE

Understanding the subjective experience of past peoples was inscribed as a central aim of Anglophone archaeology from the shift to postprocessualism in the 1980s onwards. The issue arising has always been one of method. Early attempts at treating material culture as text had mixed results, and from the middle of the 1990s there was a shift to thinking less in linguistic terms and more in material terms – from material culture as text to the material world as embodied (Johnson 2012 discusses this shift).

It is important to note that this shift underlay different overt trends in theoretical jargon. In Britain, the umbrella term of ‘phenomenology’ was rapidly adopted. In North America, a parallel shift to engaging with the embodied experience of landscape used different theoretical concepts and jargon, of ‘subjective experience’ (Bowser 2004; VanDyke and Alcock 2003). Here I use ‘lived experience’ as an umbrella term to encompass both approaches.

Criticisms of lived-experience approaches are many and varied. The most common focus on the issue of testing or evaluation; for its critics, some working in this tradition have become entirely detached from any kind of empirical evaluation (as discussed in Barrett and Ko 2009). The point I would make here is that properly conceived, understanding lived experience should be a more empirically anchored exercise than other traditions, not less. Archaeologists and historians will never be able to ‘see’ cultures, state formation, environmental adaptation… the evidential criteria held up by more traditional scholars turn out, on closer inspection, to be partly illusory. However, we can see routes, trackways, daily practices much more clearly. Therefore, a properly conceived focus on lived experience should be entirely consistent with the values on an empirical discipline. The more interesting issue concerns the affordances of phenomenology as a theoretical school. In other words, its formal tenets may not logically lead to a position in which empirical sufficiency is lacking, but we can ask the practical question of why, when cited and deployed by archaeologists, it seems to so easily facilitate and enable such a position.

A less well-explored criticism, but one I particularly want to focus on here, has been that case studies seem to invariably focus on ritual contexts. People process from ritual monument to ritual monument
and perceive the landscape through lenses of perceived ritual practice. Ancient peoples may not have perceived the landscape in this way; they may have not drawn such a divide between ritual/religion and everyday doings (as argued by some scholars in the US Southwest, cf. Fowles 2010). Particularly in the British literature, it sometimes becomes easy to forget subsistence or quotidian practices that must have taken up the bulk of the time of ancient populations – work in the fields, food preparation, tending of animals…

3. POLITICAL ECOLOGY

Work in the fields, food preparation, tending of animals are activities that engage people with the world around them, whether conceived of as ‘nature’, ‘the environment’ or ‘ecology’ – all loaded terms.

Traditionally, these relationships have been studied through the lens of ‘environmental archaeology’, using a systemic or ecological framework. Postprocessual critiques of this work were very sharp, and partly justified: in a generation of earlier studies, people maximized crop yields, engaged in optimal or efficient hunting practices, carefully balanced energy intake and expenditure in ways which seemed oddly reminiscent of modern capitalist corporations.

However, a suspicion of these ways of thinking does not lead to the position that the environment was unimportant in the past. People needed to eat in order to live, and their everyday activities and life experiences were tied up in a quite intimate way with the necessities of living off the land. The central premises of an ecological approach – that homo sapiens sapiens is an animal, that to survive the species needs to reproduce, and that the ability to reproduce is bound up with labour, energy capture and subsistence practices – remain at the heart of any serious approach to human culture. The issue, then, is the way scholars could or should think through the relations between culture and nature, not to deny the connections.

I propose three critical theoretical moves here:

- First, I posit an understanding of lived experience as an essential element of an understanding of human landscapes. Peasants do not respond to the environment: they respond to the weather, the land, the sea, the elements and their perception of how those elements change (Ingold 2000, 2010).
- Second, I propose a reinsertion of politics into our understanding of landscapes. The either/or binary between culture and environment serves, among other things, to obscure issues of inequality. Scholarly understanding of relations between humans and the land must have, close to the centre of any understanding, an account of how some humans get access to and rights over the land and its products, and others do not.
- Third, I propose that we refocus away from particular features and institutions on the landscape and towards the flows of materials, animals and humans between them. I draw here on Matt Edgeworth’s book Fluid Pasts (2011) which starts form the archaeology of water management to move towards a broader and more dynamic view of flow-scapes of movement; I also draw on Tim Ingold’s notion of task-scapes.

4. LANDSCAPE, POLITICAL ECOLOGY AND LIVED EXPERIENCE OF BODIAM CASTLE

In my conference paper, I will explore these three points through a brief consideration of the landscape in and around Bodiam Castle, in south-eastern England (Figures 1a, 1b and 2). Bodiam is a late medieval castle, constructed in or around the 1380s and associated with Sir Edward Dallingridge. Northwestern University and the University of Southampton have been working at Bodiam since 2010, in partnership with the guardians of the site, the National Trust (http://sites.northwestern.edu/medieval-buildings, accessed 29 February 2016).
Fig. 1a and 1b. Location of Bodiam Castle, East Sussex, south-east England. Drawing by Penny Copeland.

Fig. 2. Bodiam Castle from the north-west, with the floodplain of the River Rother beyond. Photo by author.
Bodiam is not a classic case study in the archaeology of landscape, since neither a fully theorized lived-experience view nor an ecological view of the place have ever been fully developed in the literature around the site. Rather, although there has been very sharp debate over the nature and role of the castle and landscape, this debate has been conducted within the frame of reference of traditional culture history (Coulson 192; Platt 2007). Within this frame, an either-or debate over the purpose and function of the castle, between ‘defence’ and ‘status’, has been interrogated in part through the landscape. The defensive efficacy of the moat and walls has been questioned, and the surroundings of Bodiam have been interpreted as an ornamental garden. A series of artificially created bodies of water, with dams between them acting as causeways to control and delimit movement, have been seen as elements of a contrived ritual setting (Everson 1996).

Our fieldwork has posited, instead, that the landscape should be conceived as a place of work (Figures 3 and 4). We see the landscape not simply as the creation of an elite man, Dallingridgee, but as the place of work of different social classes and genders. At the same time, we draw attention to the different locations of working practices. For example, the millpond does indeed act as a contrived setting for the castle, but it also powers the medieval watermill that was also built in the 1380s; the millpond itself was fed by an artificial stream or leat taken from the river Rother from some kilometers upriver (Whittick 1993). To the south-east of the castle, geophysical prospection found concentrations of bipolar anomalies, probably marking the site of kilns or other industrial activities associated with the building of the castle; so at some point in its history, the setting of Bodiam was one of industrial activity, not simply an ornamental garden. Several hundred meters to the north, a substantial earthwork formerly interpreted as a ‘viewing platform’ was probably a much older site, a centre of manorial activities including the demesne farm.

These different features and elements were not simply sited in static fashion in the landscape; they were connected by flows or practices, both physical and human. Goods from the inland, wooded area of the Weald – grain, timber, pig iron – were transported via the older Roman road to the harbor, from which they could be loaded onto barges and floated downstream. Humans and animals carried sacks of grain from the village to the mill to be ground into flour; water flowed along the leat to power the mill, and downriver to the ports of Rye and Winchelsea. A dovecote in the south-west tower of the castle attracted flows of birds inwards – doves were a common high-status food in later medieval Europe.

Further, these elements and the network of flows and practices between them formed a matrix of social and political inequality that connected individuals and institutions. The leat or stream feeding the millpond was diverted from the river Rother upstream, from the lands of the Abbey of
The abbey was closely tied to the Dallingridge family through patronage and alliance, and the flow of water was one strand of this wider political connection. Bodiam itself was originally the manor of the Wardedieu family, and as such was the home of Dallingridge’s wife, Elizabeth Wardedieu. As such, it was tied up in political structures of inheritance and patriarchy. The surrounding countryside was not a classic feudal landscape with nucleated village and open fields, but rather a complex patchwork of scattered feudal or manorial holdings, within which a growing number of affluent peasant households sought social and economic independence and advancement (Martin and Martin 2006).

5. CONCLUSION

My paper, then, will propose a move beyond rather stale and tired paradigmatic debates over landscape, to the exploration of ideas and concepts which link up different understandings. One might propose a triangle of concepts: lived experience, ecology and environment, and political economy. The most exciting and fruitful thinking mobilises ideas that link different points of this triangle. These ideas include: flow-scapes, task-scapes, practice, first and second nature, political ecology. A constellation of such ideas moves us
towards a more dynamic view of landscapes of movement and human activity in which lived experience and ecology are seen as parts of an interlocking understanding rather than as competing or contradictory paradigms.

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Learning about the past requires enormous imagination from the researchers. It is because the contemporary world occurs in a unique reality of technology, shaped by possibilities, needs and preferences of people. Archaeology is one of among these studies, whose workshop and uneven methods deliver us opportunities for learning about the actual world of the men of Stone, Bronze and Iron Ages. Representations of the bygone conditions of the landscape are a difficult matter, since the changes which have encompassed the landscape are very profound and induced by diverse factors. Without a doubt, the natural factors, either aggradation or degradation, contributed a huge role to the landscape transformation. The mass movements, including tectonics, denudation, glacial and plutonic effects, and many more in the field of dynamic geology have carved the Earth’s crust since ever. Animals and plants are also an element of the landscape as they selectively inhabit specific biotopes, whose range, accessibility and the number of secondary characteristics were not uniform and they changed over the time. Over the years, a man has become a key factor for the landscape transformations.

The ratio of the ancient settlements to the landscape variants has become the object of interest of prehistorians relatively late, only as the archaeology passed its first stages: the evolutionistic and the cultural-difusionistic. Following these stages, the so-called New Archaeology, popularized ‘the research attitude’, whose matter comes down to processualism (Binford 1962: 217-225). Within this approach any relation potentially existing in the past, with any impact on human behavior was examined. It was the first moment to have paid attention to the role of certain topographic variants as economically useful or useless, e.g. establishing of village, hamlet or encampment. As it is known, the key assumption of processualism embraced the economic sphere of human behavior. It was pointed for the preferences for placing of the early Neolithic settlements on gentle, sunny slopes, so that due to the technology of that time, the ignorance of a cartload, fertilization techniques or numerous methods to increase the crops, be able to achieve the optimal result. Anyways, the processual archaeology, thanks to the so-called settlement archaeology examined the topography of archaeological sites, including a choices of such features of location as the field form (a floor of the valley, a slope, a headland), elevation above sea level, the distance to a watercourse and the direction of exposition (Kruk 2002: 17-38). That purely formal, statistical and even numeric approach to the matter of elements of the landscape at some point stopped to be enough for the archaeologists. The science represented by them stepped into another methodological state, which has been named postprocessualism (Hoder 1986). Not only meeting the economical human needs is already the sphere of research. They will be also the spiritual and artistic needs of human now. One of the substantial foundations of postprocessualism has become the landscape archaeology (Tilley 1997; Bender, Hamilton and Tilley 2007). In the 90’s, it began to value the qualities of the current milieu for the human
behavior. One can even accept an outlining of the landscape determinism. A human behavior, his choices, directions of his roaming’s, and eventually the economy must have strictly depended on the features of the surrounding landscape. An extremely interesting twist on the approach to the role of the landscape was assigning a symbolic comprehension to it. The examples from the archaeology seem to confirm a human’s exceptional reaction to certain rock formations, resembling animals, as it occurred in the valley of Ardèche in France. Over that picturesque valley, there was ‘suspended’ a rocky bridge Pont d’Arc in the shape of a bison or aurochs ready to leap (Clottes 2003). Is it a coincidence that going upstream of the river, the Palaeolithic people arranged sanctuaries, drawing, among other creatures, bison on the walls? There are also many suggestions for recognition of individual mountains or whole mountain ranges as sacred objects of prehistory (Anati 2013). We can assume such relations in Europe since 40 thousand years, so from the time of entering of Homo Sapiens on the territories of this continent. The origins of art and symbolic behaviors was coupled with a special perception of the landscape elements. A separate issue are changes induced by human. This transformation became large-scaled in the Neolithic, when they started interfering in forests. There is still a continual discussion on the matter of the scale of deforestation. No matter on their eventual result, we need to accept that large-scale clearings or thinning’s on the sprawling areas of woods undoubtedly were fact. Surely not always such changes had to be broad and noticeable during one generation. The process of evanescence of forests and extending of the range of meadows or sward must have had an impact on the imagination. After cutting of few trees the visibility changed together with the amount of light in the daily cycle. Those were certainly substantial factors for the human’s life. Following on from this, one can imagine reactions of the members of the group to catastrophic flooding, windfalls, storms, fires, going on practically immediately and from day to day changing the appearance of the closest milieu of human.

The state of landscape was one of the leading factors in life of groups of people, affecting the life standard of a certain group, either in respect of economy or spiritual and symbolic.

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University of Florence

Quando si imposta una programma di ricerca - e, a maggior ragione, quando si propongono nuovi approcci metodologici alla ricerca - la prima domanda da porsi, come noto (ma non sempre praticato...), prima ancora che: come realizzarla? E': perché scelgo di avviare proprio questo progetto? In altri termini: qual'è lo scopo, quali gli obbiettivi del progetto e della scelta di metodo? E' (o dovrebbe essere) da qui, dalla risposta a questa domanda che discendono le scelte di come operare, di quali opzioni non solo di metodo ma anche a quali procedure tecniche ricorrere. Qui sta forse una delle origini del serrato processo di rinnovamento della disciplina (in numerosi casi configurandosi come una delle specializzazioni della scienza storica, senza aggettivi (archeologia come storia delle strutture materiali) e, credo, della stessa opzione preferenziale (certo non esclusiva) della dimensione territoriale e dello spettro diacronico (in fondo, in continuità con la connotazione di origine della disciplina: una declinazione specifica del tempo e dello spazio, un'endiaedra, per gli archeologi).

Così, si può comprendere come numerose scuole archeologiche soprattutto europee, a partire dagli anni ’70 (ma ‘precursori’ si possono sempre trovare...), hanno messo in campo nuove proposte di analisi archeologiche, appunto sul piano metodologico, variamente orientate. Considerando, per esemplificare, l’apporto di alcune scuole medieviste italiane, si può ricordare in particolare l’archeologia dell’edilizia storica (archeologia dell’architettura), ma più in generale si può fare riferimento all’archeologia globale’ (di Tiziano Mannoni, ‘padre nobile’ dell’Archeologia Medievale italiana, fino alla fine degli anni ’50), fino allo sviluppo dell’’archeologia leggera’ (un esempio di scuola fiorentina nel contributo qui presentato). Il senso di tali procedure di analisi ad ampio spettro corrisponde - coerentemente a quanto avviene ad opera di altre scuole archeologiche europee (segnatamente, ma certo non solo, medieviste), a cominciare dalla stessa rivoluzione’ metodologica proposta sempre, significativamente, dagli anni ’70 di Harris e della sua ’matrix’) ad una nuova forma di focalizzazione degli obbiettivi in direzione della ricostruzione storica (non reperti da cui ’dedurre’, ma tracce materiali nell’ambiente di eventi come ’mattoni’ per la costruzione di contesti da interpretare). Il ‘fenomeno’, dunque, al centro del sistema, oltre l’episodio: da un procedimento, si potrebbe anche dire, deduttivo, ad uno induttivo.

Cosa accomuna infatti questo approccio archeologico che, complessivamente, si definisce ‘territoriale’ (il paesaggio come palinsesto culturale, da indagare ,stratigraphicamente’ ma anche da interpretare come risorsa non solo da conservare per il futuro delle comunità di riferimento, magari in un’ottica di public archaeology) e che in modo crescente, esponenzialmente, vede complesse ricerche, oramai di ogni epoca ed interpretate da numerose Scuole internazionali? Molte cose, naturalmente (ed oramai molte cose anche le divide: un discorso che ci porterebbe ora lontano), a cominciare da una diversa concezione del rapporto interdisciplinare e dell’uso dell’archeomatica e delle nuove tcnologie in generale. Ma, l’impulso d’origine ed i percorsi scientifici interessati in seguito, credo possano appunto essere riconosciuti esattamente in
un’intenzione marcatamente storicistica ricercata e conferita alla prassi archeologica di numerose (ora prevalenti?) imprese e istituzioni archeologiche. Si potrebbe sostenere che il percorso concettuale (oltre e prima delle susseguenti definizioni teoretiche dei diversi approcci culturali e metodologici dell’attività disciplinare: da Hodder a Giannichedda) possa essere definito, come dicevamo, dall’”episodio” (scavo, classe di materiali) al ‘fenomeno’ (con il contesto, nelle sue varie accezioni, come base documentaria e indagine con procedimento induttivo). Ed il Convegno, in un momento di svolta dell’attuale archeologia, anche a fronte di scenari politico-culturali che connotano il nostro tempo, credo costituisca, proprio per l’estesissimo ed eccezionalmente variegato spettro di approcci tanto metodologici quanto tematici, una evidente testimonianza della vitalità - ancora a volte concettualmente tumultuosa, quando non anche per qualche tratto contraddittoria - di tale indirizzo della ricerca archeologica.
HIDDEN CULTURAL LANDSCAPES OF THE WESTERN LESSER POLAND UPLAND. PROJECT OVERVIEW AND PRELIMINARY RESULTS

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ABSTRACT
The aim of the project is to study the cultural landscape of prehistoric communities of the Western Lesser Poland Loess Upland. Its basis is the acquisition of data collected through the application of non-destructive archaeological prospection techniques. These include airborne remote sensing, terrestrial geophysics, intensive field-walking surveys and GIS analyses. The use of the proposed methods enables the interpretation of various aspects of the prehistoric communities in a regional dimension, beyond the micro perspective which limits viewing past settlement activities as a series of unconnected points in space. The proposed study area spatially encompasses a compact and distinctive stretch of the fertile Southern Poland loess zones, located approximately in the centre of the Lesser Poland Upland. The study area includes the Nida River Valley and reaches the Miechów Upland and Proszowice Plateau encompassing an area of over 2500 km². This region possesses abundant archaeological resources including rich and diverse settlement forms from different sections of prehistory and a long and intensive research tradition which will allow a balanced and credible assessment of the applied methodology.

Keywords
cultural landscapes, archaeological prospection, aerial archaeology, geophysics, Lesser Poland, prehistory

1. INTRODUCTION
The aim of the project is to study the cultural landscapes of prehistoric communities of the Western Lesser Poland Loess Uplands through the application of non-destructive techniques. These include remote sensing, geophysics, analytical surface surveys, archival query along with Geographical Information Systems (GIS). The project will take place between 2015-2018. The study will allow to estimate the cognitive capabilities of the proposed set of prospection methods, as well as the enrichment of the existing knowledge through the discovery and revaluation of settlements and structures, whose identification was not possible through field-walking (e.g. monumental structures, such as ditched enclosures, tombs, barrows, groove objects, defensive structures, road systems, etc.), which for over 30 years has been the preferred method of settlement and landscape studies in Poland. The purpose of the project is the development of both technical and research aspects, such as:
1. Understanding the function, layout and archaeological chronology of the sites through the morphology of their geophysical and spectral signatures;
2. Estimation of the potential of various soil units for the discovery and study of archaeological resources;
3. The spatial relationship between synchronic sites;
4. Registration of temporal settlement patterns;
5. Assessment of non-destructive methods of data collection compared to traditional methods and available datasets;
6. Registration of previously unknown or unexpected archaeological source categories.

2. STUDY AREA

The project study area encompasses a compact and distinctive stretch of the South Poland loess zones, located approximately in the centre of the Lesser Poland Upland (Fig.1). The central part of the study area includes the Nida River Valley and reaches Miechów Upland and Proszowice Plateau. This area is closed from south by the Vistula Valley, and from the west by the Kraków agglomeration and Dłubnia River Valley, encompassing a surface of over 2500 km². This is an area of rich and diverse settlement activities from different sections of prehistory. It also has a long history of archaeological research, being relatively well recognized and constituting many scientific works including excavations, surface artefact collection and settlement studies. The study area has been largely recognized by the Archeologiczne Zdjęcie Polski (trans. Archaeological Record of Poland, abbreviated further as AZP) programme (70 grids, each 35 km²).

3. PROJECT OVERVIEW

Polish settlement studies in archaeology have a long history, derived from settlement geography, characteristic for the cultural historical school of thought. Deep reflections on the theoretical and practical foundations began primarily in the 1960s and were related to the activities of Stanisław Kurnatowski (e.g. 1965, 1968). The selection of the project’s study area was also heavily inspired by Janusz Kruk’s influential
“Studia osadnicze nad neolitem wyżyn lessowych” in 1973 (trans. Settlement Studies on the Neolithic of the Loess Uplands). It was not limited to the cultural-historical analysis of finds within sites but involved recognition of the environment and past human spatial activity within it. An important role in these studies was held by settlement relations with regards to past environmental conditions, which were reconstructed through interdisciplinary collaborative efforts with representatives of natural sciences.

Surveys carried in the 1970’s preceded and were one of the foundations for the elaboration of the research objectives and methodology of surface surveys, which in time became the basis for the assumptions of the AZP programme (Mazurowski 1980; Konopka 1981; Kruk 1981). Further similar projects ensued that took place in South Poland but regarded other ranges of the chronological spectrum (Rydzewski 1983, 1986; Nowak 1993; Dobrzańska 1995; Kadrow, Machnik 1998; Madyda-Legutko, Poleski and Krapiec 2005).

Landscape studies are now one of the fastest developing topics in archaeology (eg. Leusen, Pizziolo and Sarti 2011). The main contribution to this research was theoretical thought stemming primarily in the Anglo-Saxon archaeological circles (eg. Aston 1997; Tilley 1997), as well as the technical progress and the emergence and spread of non-invasive prospecting methods, allowing fast-paced recognition of large-scale areas (Scollar 1990; Becker et al. 1996; Gojda 1997; Misiewicz 2006; Campana, Piro 2008). These methods (further reading Wilson 2000; Kuna 2004; Aspinall, Gaffney and Schmidt 2008; Corsi, Slapšak and Vermeulen 2013) provide large datasets which (due to various imperfections of particular techniques) may be sensibly used only through complementary, multi-method approaches. Interdisciplinary projects for recognition of the cultural landscape using non-invasive methods have been successfully implemented by numerous archaeologists from Western Europe (eg. Stonehenge, Gaffney et al. 2012) as well as Central Europe (eg. in the Czech Republic by Gojda 2004).

The application of such methods in the "Hidden Cultural Landscapes..." project is an attempt at registering various archaeological landscape components whose discovery and understanding through traditional methods is severely limited through uncontrolled variables (e.g. visibility of finds, the lack of surface artefacts). The use of non-invasive archaeological data acquisition allows the understanding of settlement forms in a continuous manner within the landscape, bridging ‘open spaces’ between settlement areas and temporal transformation, at the same time gathering archaeological sources without destroying them. It is an attempt to find an equilibrium between chronological and typological aspects of archaeological knowledge and the identification, analysis and interpretation of traces of past human activity and cultural behaviour within the spatial and landscape context and as such represents an alternative to the mainstream Polish research tradition.

The study area (on a national scale) is extremely abundant in archaeological resources but has never been covered by a macro-regional non-destructive (remote sensing, geophysical) study. The project is enthusiastically oriented towards existing AZP results as a valuable source of complementary (cultural-historical) data that may be an important corrective factor in a holistic interpretation of the acquired datasets. In its current form AZP site plans and maps are paper only - which severely limits their implementation into GIS databases and hence will be digitized. Despite this general enthusiasm data derived from the AZP programme requires a critical approach. AZP remains unfortunately resilient to attempts of modernization, both from a theoretical and practical perspective (e.g. Rączkowski 2005). A discussion on the method's fundamental limitations is gradually surfacing to a more mainstream debate. This change is reflected in numerous conference programs and scientific publications (e.g. Dulęba, Wroniecki, Brejcha 2015). Thoughts on the quality and nature of the surface finds reveal the biggest limitation of this type of data: sources acquired through artefact surface collection are not a direct representation of ancient human activity. This may be due to cultural behaviour in the past, the dispersion of the monuments through agricultural work or even technological aspects of ceramics affecting their state of preservation.
4. METHODS

The choice of methods for the project is a compromise between factors such as financial constraints and projected effectiveness of the applied techniques in relation to aims, objectives and theoretical framework. The proposed methods allow the analysis and interpretation of various aspects of the prehistoric communities in a regional dimension, beyond the micro-perspective of a single site. Their application aims to overcome a certain analytical-interpretational stagnation in national cultural landscape and settlement research. Extensive use of non-destructive methods of prospecting is also important from the perspective of contemporary doctrines relating to the protection of cultural heritage as it allows the procuring of new archaeological sources without the unfortunate side effect of destroying them at the same time.

4.1. Remote sensing techniques

Based on the exceptional achievements of the English National Mapping Programme (Bewley 1995) the implementation of a similar strategy has a great potential in providing new information on both the field of evaluating and discovering archaeological sites. Remote sensing techniques will form the fundamental part of the project's workflow. New data first and foremost will be obtained by conducting low-altitude, light-aircraft aerial prospection surveys. These will help procure oblique and vertical aerial images of archaeological crop, parch and soil marks. Flights will be carried out between May and July, based on atmospheric conditions. Information from images will be subsequently extracted (via digital georeferencing), mapped and interpreted. Twelve hours of flights are planned for each year of the project (in total 36 hours of flight time). Auxiliary data will be acquired from internet sources and national archives: orthophotomaps (contemporary and historical) and Airborne Laser Scanning derivatives. Data from sources such as Google Earth, Bing Maps will be included in the interpretational process. This is a pragmatic compromise between acquiring new and utilising to their fullest capacity previously acquired, freely accessible data that has yet to be thoroughly studied.

4.2. Geophysical techniques

The second stage of the data acquisition workflow will be geophysical prospection consisting solely of magnetic gradiometry. In general, terrestrial surveys will be selected based on areas of interest located through aerial prospection. A minimum of 24 hectares are planned to be surveyed. Magnetic anomalies will be classified and interpreted. Other geophysical methods are not used in the project, although their inclusion would be beneficial. This is motivated by the fact that the magnetic method has proven to be highly effective and economical in the area (eg. Herbich, Tunia 2009). Including other methods would decrease the already arguably small (especially in comparison to the whole study area) area foreseen for magnetic prospection.

4.3. Analytical surface artefact collection

The analytical method of the surface artefact collection will be an alternative approach to a very popular method and "makes it possible to carry out quantitative analyses of data, and to achieve their synthesis using formal mathematical methods" (Kuna 1998). Landscape components based on geophysical and remote sensing data will be divided into grids of various sizes ranging from 25m x 25m to 100m x 100m. Mass surface finds such as pottery sherds will be localised by GPS for point GIS analysis and collected within these grids. This will allow for a understanding of intra site temporal and cultural shifts, the interpretation and verification of non-destructive features (Gojda 2006; Rączkowski 2011). Individual grids will possess various attributes with regard to aspects of mass finds contained within them such as weight,
amount, vessel morphology, cultural and chronological classification. These results will be visualised in GIS software with the use of statistical methods for each reference unit. Such visualisations will be indicative of the possible extent of anthropogenic or settlement activities but also show the variable level of preservation of subsurface layers due to ploughing, soil erosion or other more recent landscape changes.

4.4. Geographic Information Systems (GIS)

Geographical Information Systems will form the backbone of the integration of a variety of available datasets, their multi-level classification and statistical and spatial analyses. The database created for the project will be the primary analytical tool, focusing information acquired during the implementation of each of the research stages. It will be systematically expanded for the duration of the project and updated with all the collected and processed measurement data (AZP sheets, plans, contour maps, historical plans, orthophotomaps, aerial photos, maps the distribution of measured physical characteristics, distribution of surface artefacts, digital terrain models, LiDAR/ALS derivatives). This will allow for the creation of an advanced tool, coherent with accepted contemporary standards, indicating and aiding the planning, decision and interpretative process.

4.5. Geodesy

Geodesy will be an integral part of the analytical surface distribution studies and geophysical surface measurements. In accordance with field practice, all geophysical data will be carefully located in the field or on base-maps. The lack of such information deprives the possibility of precise continued investigation which is contradictory with the project’s integrative and complementary character. Data will be gathered with the use of Total Station and Real Time Kinetic GPS instruments.

5. SELECTED CASE STUDIES

5.1 Aerial survey

Pre-project aerial surveys have been conducted with various degree of regularity since 2010 (Fig. 2) with a total of 25 flight hours between 2010-2014 (Fig. 3). Two project surveys have been carried out, the first one 02.07.2015 and the second one 18.09.2015 summing in 8 hours of flights.

Aerial prospection in this part of Poland suffers from serious drawbacks. Even in times of severe droughts, such as the one that Europe experienced in 2015, soils in southern Poland are characterised by high humidity indexes. This is caused by high summer rainfall, frequent storms which are shaped by a variety of air masses, especially the dominant western polar-maritime masses, bringing warmth and humidity. Due to these circumstances no extraordinary difference was noted between the emergence of crop marks in June of 2010 (during heavy rainfall and flooding) and July of 2015 (during an exceptionally warm and dry summer).

Land use also has a critical influence on the possibilities of aerial observation. Fields in Lesser Poland are frequently extremely parcelled (i.e. long fields with dimensions of 10x200m). Each strip usually has a different owner and therefore crops are non-uniform. Agriculture in Lesser Poland often favours non-cereal crops such as sugar beets or parsnip (and more recently maize) which rarely generate archaeological crop marks. In theory the situation seems hopeless, though past practice has shown that through patient observation, despite these unfavourable conditions, positive results can be achieved.

Aerial prospection (Fig. 3) in pre-project years was a purely hobbyist venture and privately funded by the author and like-minded enthusiasts (Wroniecki and Maksymowicz 2014). It began as the "Prospekcja Małopolska" (trans. Lesser Poland Prospection) project in conjunction with the creation of
Fig. 2. GPS Flight paths. Black - Pre-project surveys in 2010-2014, white - project surveys (2015).

Fig. 3. Overview of flight hours in 2010-2015.
a short documentary film on aerial archaeology called "Czy leci z nami archeolog" (trans. Is There An Archaeologist On Board). Results of these surveys and the film itself have been released on the Creative Commons license and may be viewed at http://archeolot.pl. Flight dates were hence chosen based on non-archaeological circumstances such as airplane or free time availability and limited to areas which were known to generate crop marks. Two-seater, high wing aircraft flights were non-systematic and included free roaming in search of crop marks, the documentation of previously discovered crop mark sites and flights over known (usually hill-forts or previously excavated) sites. Numerous discoveries and observations were conducted amounting to a collection of over 3000 archaeologically sensitive digital images, revealing over 30 high potential landscape components such as promontory ditch enclosures, field systems, abandoned modern farmsteads, roads, trenches, closed and open settlements, medieval strongholds, burial mounds, large-scale prehistoric ditch systems. Over 200 small clusters of crop marks were also photographed. Very few of these discoveries led to further fieldwork with other method sets. Lack of possibilities to verify information from aerial images led to a visible stagnation and drowning of enthusiasm over the years, with fewer undertaken flight hours. The pre-project experiences were however crucial in the formation of a reliable view of the methods positive capabilities in the region.

Thanks to steady funding the 2015 surveys were carried out as part of a larger plan which will allow the relatively complete and balanced coverage of the study area and concentrated in its eastern part. The project foresees a maximum of 36 flight hours so they need to be carefully distributed area and time-wise. Future surveys will concentrate in the central (2016) and western part (2017).

The highlight of this year's aerial survey was the registration of a vast crop mark site in Rzemienowice, Opatowiec commune (Fig. 4).

The aerial image revealed a vast set of crop marks, mostly rectangular in shape, around 5x5m, occupying an area of around 8 ha. This is one of the few regions that lacks AZP data so comparison with surface finds could be made. The crop marks are located on an arable field on higher ground, east of the Rzemienowice village. The minor Młyńska river, a tributary of the Vistula river is located to the south. It may
be surmised that the aerial image shows subsurface archaeological features that may be attributed to a large open settlement. The morphology of the features and their location within the landscape is typical of Iron Age, Przeworsk culture settlements and such a preliminary interpretation seems viable. Based on the project workflow, this site has been chosen for further geophysical survey and analytical surface artefact collection which will aim at verifying this hypothesis.

5.2. Magnetic gradiometry

The 2015 aerial survey also revealed an archaeological place of interest in Małżyce, Czarnocin commune. A 5m wide curvilinear crop mark located around an extensive hill, enclosed an area of 8 ha (Fig. 5). AZP data was available and comparison showed that pottery artefacts were found in the enclosed area, attributed prevalently to the Bronze Age. No information about vast ditch systems or earthworks was noted in the AZP data. From square one this led to the preliminary conclusion that the aerial data could be attributed to a vast, rare & closed prehistoric settlement.

It was presumed that further subsurface archaeology exists in the area, though aerial images did not reveal other features of note. Further work was conducted in November 2015 including a magnetic gradiometry survey (Fig. 6) in order to complement the available data. A multitude of additional archaeological features were registered as magnetic anomalies (Fig. 7). Positive point anomalies interpreted as fills of pit features were located in two clusters near the northern and southern extents of the enclosure. The enclosure system itself was revealed to be much more complicated than implied by aerial imagery. The 5m wide  was clearly visible in the geophysical data in its eastern course and secondary, smaller ovaloid double ditch were noted, adjoining to it. The central part lacks signs of human occupation, perhaps owing to erosion. If this meshwork of archaeological features functioned at the same time, then perhaps the central area was used for different activities than habitation such as mercantile or religious activities, leaving space for further archaeological investigation.

Surface artefact collection carried out simultaneously with the geophysical survey revealed 124 pottery sherds, weighing 824g. Out of these 48% of finds were attributed to the Bronze Age Lusatian Culture, 38%
Fig. 6. Malżyce, Czarnocin commune. Results of magnetic gradiometry survey 2015 ±1nT (light to dark).

Fig. 7. Malżyce, Czarnocin commune. Interpretation of geophysical and remote sensing data (black), magnetic gradiometry survey (white).
to modern finds (most likely agricultural rubbish), 12% could only be generally described as prehistoric, 1% to Funnel Beaker Culture and 1% to Przeworsk Culture. Most finds concentrated near the southern part of the 5m wide curvilinear feature. Almost all of the surveyed fields were ploughed but artefact visibility could have been limited due to very dry weather and lack of rainfall. The prevalence of Lusatian Culture finds implies that the features discovered by aerial and geophysical prospection may date to the Bronze Age, though lack of Neolithic finds may be due to their poor preservation (due to technological aspects).

A settlement interpretation of these datasets imposes itself and shows that this landscape is home to a developed, exceptional structure without published analogy within the modern bounds of Poland. Further work is planned on this site including the expansion of the geophysical survey, repeated field-walking and further aerial observation.

6. CONCLUSIONS

The archaeological landscape approach takes into account data from territorial units unfathomable even to rescue excavations, allowing the study of large spatial structures within macro regional contexts. It also deals with important (cultural) activities that do not manifest in clear physical forms. Indeed, non-destructive methods mostly fail at procuring material culture and chronological evidence, however they excel in the recognition of cultural features not definable by traditional approaches and also shed new light on heavily researched subjects (see Fig. 8), often dramatically changing their interpretation.

The benefits of non-destructive methods can also be quite pragmatic. They speed up the process of archaeological research at least ten-fold, requiring less time and financial input and generating (arguably)

![Fig.8. Malżyce, Czarnocin commune. Comparison of non-invasive dataset (white) with AZP dataset (scan of original AZP documentation).](image-url)
higher quality data. Non-invasive techniques also shine in their role as pre-exca
vation prospection tools and in this manner are generally accepted by the ar
cheological milieu in Poland. This approach based on the practical needs of the (tradi
tional) cultural-historical paradigm pigeonholes such techniques like geophysics or remote sensing solely as prospection methods and denies them the position of fully fledged, though alternative, research tools enabling the study of past societies. This alternative methodology employed in the "Hidden Cultural Landscapes..." project already has shed new light on the frequently recurring object of archaeological interest which is the Lesser Poland Loess Upland and it is already apparent that a significant reevaluation of this landscape will be possible by the project's end.

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URBANIZATION OF DOON VALLEY.  
A CASE STUDY OF DISAPPEARING CANALS

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ABSTRACT
The valley of Doon is located in the lap of the great Himalayas in the North and the Shiwaliks in the South, having an area of 1875 square kms. Dehradun, the most prominent city located in this valley, was originally established in 1675. The popularity of the valley kept increasing with the passage of time. The population of the city was 28,100 in 1901 and 578,420 by 2011.

The water coming from the various Himalayan streams was channelised to fulfill the demand for water. The first canal was built more than three hundred years ago, by the local rulers. When the British occupied the area, Capt. Poseby Cautley was placed in charge of the canals. By 1900 the length of canals in the valley stretched over 125 kilometers.

With the radical urbanization that has occurred since 1990, the canal system of the Doon valley has been encroached upon. The proposed paper seeks to trace the history of the canal system in Doon and its contribution towards the ecological balance and cultural landscape of the valley. The paper also aims to suggest recommendations for the preservation of this heritage, which is integral to tracing the connection between the past and the present residents of the valley.

Keywords
Landscape, Environment, Doon valley, Culture, Language, Canals

1. INTRODUCTION

Doon, means a ‘valley’ or a low land between two mountains. The territory of ‘Dun’ is 75 kms long and 25 kms wide with Himalayas in North and Shiwaliks in South. Two important rivers of North India, Ganges and Yamuna flow only hundred kms apart from each other, on east and west side of the valley respectively. The valley encapsulates the once quaint city of Dehradun. First historical proof of human activity in the valley is during the Mauryan period (321-184 B.C.) when Emperor Asoka (274-232 B.C.) installed a rock edict on the bank of river Yamuna, fifty kms west of Dehradun. The valley has pretty much been occupied since then. The Doon later became a place, to take shelter in for people in exile and refugees. Another turning point in the history of the valley was in 1815 when the British East India Company occupied it. At this time there were about forty villages in the valley and the total population was 17,000 (Walton 1909: 85). The occupation of Dehradun by the Britishers has had the most impact on its contemporary landscape.

When the British took control over the Doon, they decided to improve the infrastructure of the town. Meeting the soaring demand of water was foremost on their priority list. They constructed a well in the court compound. But on realizing that the constructional cost of the well is too high and the water table in the area is too low, the plan was not considered practical (Walton 1909: 43). However, very soon the British discerned that during the time of Guru Ram Rai, Rani Karnwati had built a canal brought water from
Rispana river to the Durbar. The dam on Rispana river was called Kelaghat. It was then that the British started exploring the possibilities of building more such canals. The system of canals meant water will reach the villagers not only for irrigation purposes but also for drinking purpose (Walton 1909: 43).

In 1840-41, Cautley designed the Kutha Pathar Canal, which gets its water supply from Yamuna and irrigates large areas of Western Doon. The Beejapore Canal was designed by him in 1837 to irrigate the triangular tract between the Tons, the Asan and the Bindal rivers. In 1859-60 the Khalunga Canal was constructed, while in 1863-64 the Rispana Canal was completed. The Khalunga Canal, brought waters to Badripur, Jogiwala and Nathanpur villages in 1860. A strip of land, 40 feet in width, all along the canal was acquired by the authorities. The residents of Badripur declined to take compensation for the land which was thus acquired as they believed that the canals would do more good than harm. (Pradeep Singh 2011: 252)

Four out of the five of canals, except the Kutha Pathar canal which gets water from Yamuna River, get their water supply from local springs and snowfall on Mussoorie hills. If the rainfall is low, there arises a very difficult situation of more demand and less supply of water in the canals. The canals lent a unique character to the valley of Doon. Lady Emily (Sister of Governor General of India Lord Aukland, who visited Doon in 1840s) while talking about the Rispana canal says that, “its water was bright, clear, cold and delicious” (Prem Hari Har Lal 1993: 283).

1.1 Remarks/ methodology

The author has relied upon archival records, emails, open ended surveys, videos, physical artefacts to gain in-depth knowledge and understanding of behaviour and the reasons for it. The analysis of remote sensing data enables in depth monitoring of urban growth pattern. The monitoring of urban growth based
on windrose scheme is easy to understand even for a layman and it gives clear view of how urban growth has taken place over a period of time in different directions as well with distance from city centre.

2. CONTENTS

With the passage of time, these canals have been encroached upon or have disappeared to meet the demand of wider roads. The original canal, which used to pass through Dhara Chawki and Nahar Wali gali to Durbar had disappeared before the independence in 1947. This is where the Clock Tower and the main market of the city are situated now. The East Canal, bifurcated from the Rispana Canal at Dilaram Bazar. Along the way, it has some very important historical buildings of the city such as Survey of India and Kabul House. Presently, the city has East Canal Road, with the canal nowhere in sight but flowing underground.

Similarly, the Bijapur and Khalanga Canals are flowing underneath the newly constructed roads now. If one wants to see these canals today, he/she has to go to the extreme outskirts of the city to hear the gurgling waters. With the disappearance of the canals the city is not only losing one of its most important heritage, but also its character. It’s no surprise that with the the destruction of canals even the ghurats or the water mills that dotted the landscape of the valley have been destroyed or turned completely dysfunctional. The citizens now find themselves in this rendition as a result of unplanned development. But even if were to ignore this fact as being a mere hypothesis, the fact that demolition impoverishes cannot be ignored. Demolition not only destroys the aspirations but also the possibilities that the citizens had created for themselves.

The landscape of the valley speaks a lot about the occupation, the trade, the culture, the language and the habits of its residents. The valley not only had a lot rivers and ravines, it also had many natural water sources as can be deduced from the names of several places like Teen Pani, Jhari Pani, Guchchu Pani, Khatta Pani and Karwa Pani. Pani means water, in Hindi. The role of landscape cannot be undermined in shaping the character of the communities in the past. For example, prior to arrival of the British in Dehradun, Rani Karnwati and her predecessors were living and running the administration from the area Nawada, which is in east of the valley. When British arrived new settlements came up along the newly constructed canals and it is because of their efforts that water was available to new areas of valley. Nawada remains in ruins now. Therefore, it can be concluded that the area of occupation in the valley was largely affected by the flow of the canals.

Similarly, East Canal Road witnessed important historical activities when Karanpur, Kabul House, Survey of India and Dalanwala areas came up along with this canal. MKP College which is hardly 700 metres away from the East Canal has defunct water channels till today as a reminder of this water system which was once prevalent in the city. On being interviewed, many employees of the college have stated there was a fixed time allotted to college for water and their job was to open and close the source of channel at that time. Since, a fixed time was allocated to different areas such as colleges, commercial areas and housing areas, people mingled with each other at the allocated time to collect water. Canals were also a respite for young boys during summers when they used to bathe in the water. Another usual sight near the canals was fishing with the help of umbrellas. Catching snakes and putting them in bottles was another rustic fun boys enjoyed near canals. Boys collected coins, ginger, coconut and lead from canals when there was no water flowing in them. Not only were the canals used recreationally, but they also had an impact on the temperature of the town. They kept the temperature of the valley in check and also helped in the balance of the humidity. Additional use of the canal was that the flour produced in ghurats (water run mills) tasted better and was also healthier and more nutritious as the process took more time in ghurats. It process of churning flour was called thandi pisai All these linguistic, culinary and cultural traits stand apart from the geographical entity called Garhwal which lies on the North of the valley.
simply because of the role being played by the landscape. Thus a cultural composite called the Kathmali culture came into being.

Famous writer Ruskin Bond writes, "The entire Eastern canal has now been covered over, presumably it is still there, flowing underground; but it was a familiar landmark once, running the entire length of the Eastern Canal Road. There was a shady spot, just where it emerged at the commencement of the Old Survey Road, and here there were clusters of maidenhair fern growing from its banks. I would sometimes collect the ferns and take them home, but they would not grow anywhere else". (Ruskin Bond 2008: 219)

The canals system had a unique effect on the architecture of the valley, the culture of the people and on the *lingua franca*. They provided a feeling of selfhood to the dwellers and distinguished them from people of other hilly areas. The canals became an important reason for the change of names of many places such as *Nahar wali gulli* (lane with canal), *dhara chawki* (Police Station beside the stream), East Canal Road, *Chakki number 4 ka bus stop* (Bus stop near the fourth water mill), *talaab wala school* (School with the reservoir). Residents had now started referring to places based on their distance/direction from the streams of water. This composite culture is specific to the *lingua franca* of the valley of Doon. Another evidence of the change in terminology can be seen in *khala* (deep seasonal stream), *tarla* (lower area) and *johurd* (pond). *Walas* signify habitations, bondings, familial, cultural and geographical too to some extent. Each *wala* was separated by the other through dense forests, different terrains and landscape specifications. They also became cultural entity in themselves because of their locations up the hill and down the hill and Dehradun has about hundred places with 'wala' attached to them like Nimbu-wala (Nimbu is lemon in English), Aam-wala (mango), Anar-wala (pomegranade), Kuan-wala and Brahman-wala (one of the four castes of Hindu society).
Irrespective of whether the canals flow today or not, these names are still used. Prior to the construction of the roads, people used to follow the streams of water to reach the interior villages. Locals built temples and rooms for the travellers to stay and spend their night resting along these streams. Therefore, most of the canals were dotted by various temples along their path. The purpose of the temples was not religious in nature but lodging.

Most of these water sources have dried up recently because of rapid urbanization in last fifteen years. Dehradun became the capital of the newly formed state of Uttaranchal (now Uttarakhand) in 2000. One of the first victims of this rapid growth were the canals of the city. 70 per cent of the Doon Valley population is dependent on public water supply. Water shortages mean longer queues, longer waiting hours, and less water collection for most families. On the average, those dependent on the public supply spend 2 hours a day on water collection, while in certain localities the waiting time is nearly 4 hours. Besides this wastage of human work potential, water scarcity is becoming a source of serious social conflicts among those who are the victims of such water resource destruction.

According to 2011 census, the current population of the city is 578,420. It is obvious that such growth in the population will have a toll on the natural resources. Over the years temperature of the valley has risen and humidity level gone down. During monsoon it was common to have uninterrupted drizzle for days. In the local language people called it ‘jhari’. In the last few decades this phenomenon can barely be seen. Damage to vital resources such as water, through the destruction of the essential ecological processes controlling the hydrological balance of the Valley, has been perceived by the people as a violation of their political and economic right to a decent though often minimal share of the vital resources that are needed for their biological and economic sustenance.

The impact of this crisis in water resources is unequally divided between different groups of human society, such that 70 per cent of the population which cannot afford private water connections is increasingly deprived of water. Of the 30 per cent which has a piped supply in their homes, about 5 per cent can overcome natural shortages by capital-intensive technological solutions to which they alone have access. Underground storage wells and pumps can provide twenty-four hours daily supply of running water in homes which can afford an initial capital investment of Rs. 5,000 to Rs. 6,000. The ecological crisis clearly affects the poor more drastically than the rich, despite the prevalent myth that concern for a ‘stable ecology’ is a luxury which only the latter can afford!

In the villages in the hills, the impact of destruction of water resources is even more drastic than in the towns. The drying up of springs or a decrease in spring discharge means the destruction of the only alternative available to most villagers. While nature treats all humans equally, development plans do not. Only 20 per cent of the total population of India is supplied safe drinking water, and scarcely 50 per cent of the total rural population is provided this vital resource. Most water development is for urban areas. Such villages as those in the Doon Valley, which were provided safe drinking water by nature in the form of springs, will join the 1.52 lakh ‘no-source’ villages once their springs run dry. For the government this will mean an insignificant increase in the statistics, but for the women in those villages it will mean longer distances over tough terrain and longer hours to collect an essential resource for their families. For the families of these women, especially the children, it will mean increasing disease and morbidity.

3. CONCLUSION

In the struggle to protect the environment, it was said that nature can never be managed unless the people closest to it are involved in its management. In tropical regions, water resources are widely maintained through a very delicate balance with the local ecosystems, such that even small disturbances can completely destabilize water supplies because of the climate, the heavy seasonal rain and the high mountain ranges which are the catchments of many of the major rivers. Hydrological destabilization through deforestation
or other ineffective land management in these catchments often increases instant run-off leading to floods in the monsoons and drought in the lean season. This degree of destruction of water resources would not, however be caused by a similar land use abuse in ecobiomes where the rainfall distribution and the slopes of catchment areas are not extreme. The rapid destruction of canals threatens the healthy biological survival of human communities in Doon and forecloses opportunities for their economic development. The destruction leads to degradation of the quality of life. The natural endowment of these mountain ranges and natural supply of water is an essential part of the resource base for the economic activity of the people in the region. The deepening ecological crisis is, however, making it imperative that nature's values and functions be taken into account.

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ARCHAEOLOGICAL AND ARCHAEOPEDOLOGICAL APPROACHES TO ANALYZE THE DEVELOPMENT OF MARGINAL AREAS IN PREHISTORY. A CASE STUDY FROM THE WESTERN BAAR, SW GERMANY

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ABSTRACT

The first results of an interdisciplinary research project are discussed: It explores the pre- and early historic settlement dynamics between favorable and unfavorable landscapes in SW Germany using an integrated archaeological/archaeopedological approach with a focus on colluvial deposits. The study area extends from the eastern slopes of the Black Forest across the Baar to the southwestern part of the Swabian Jura. We provide evidence for continuous land use at the boundary of the Black Forest from the Younger Neolithic onwards. Land use even in gentle rolling areas such as the Baar triggered soil erosion leading to a coverage of archaeological sites with younger sediments at foot-slope and mid-slope positions. We detected phases of land use during the transition from the early to the middle Bronze Age and the Roman period – for which no archaeological indications were available so far. Our combination of different disciplines appeared as a major advantage for the exploration of low mountain areas. Our results also question the commonly held notion, according to which modern marginal areas were perceived as marginal areas in prehistory as well.

Keywords
Landscape Archaeology, Archaeopedology, Colluvial deposits, Baar, Black Forest

1. INTRODUCTION

The Black Forest is one of the most famous examples of low mountain ranges, which are commonly the classic marginal areas in Central Europe (Denecke 1992: 9–10). It is the largest and highest low mountain range in Germany. Considering the natural conditions and the historical records, since the early 19th century it was a general agreement that the Black Forest was not continuously inhabited before the High Middle Ages (Brückner 1980: 159–160; Sick 1992; Schaab 2003: 7–12). Thus the Black Forest was thought to have been the last marginal landscape in SW Germany to be settled. Hence it is called “Jungsiedelland”, i.e. late-settled landscape (Gradmann 1948; Gradmann 1964a: 56–89).

This view was generally supported by archaeologists until the 1990s, arguing that the Black Forest was an impenetrable primeval forest, which people avoided whenever they had the chance to do so. Archaeological finds were either ignored or interpreted as evidence of occasional expeditions (Wahle 1973: 6, 10; Sick 1992: 49–53; Schaab 2003: 5–8). Often demographic pressures and conflicts were hypothesized of being the main triggers for enforced movements into the Black Forest (Kullen 1989:
However, until the 1990s, no field surveys were conducted to test this hypothesis (Valde-Nowak and Kienlin 2002: 40). In the early 1990s excavations of Mesolithic open air sites provided evidence for early human presence in the Northern Black Forest (Pasda 1994). They also show that the visibility of the archaeological sites is restricted in low mountain ranges, on the slopes by dense forests and in the valleys due to recent deposits (Pasda 1998). When systematic field surveys were carried out on the western side of the Black Forest in 1999 and 2000, numerous Mesolithic and Neolithic sites were located (Valde-Nowak and Kienlin 2002; Kienlin and Valde-Nowak 2004). Archaeobotanical studies provide additional evidence for early anthropogenic activities in the Neolithic and an unambiguous land use in the following Bronze and Iron Ages in the Northern Black Forest (Röscher 2009; Röscher et al. 2009). It was also possible to connect the land use from the Late Iron Age to the extraction and smelting of iron ores (Gassmann et al. 2006). In addition, pollen profiles and alluvial deposits are known from the Middle Black Forest holding out the prospect of land use during the Bronze and Iron Ages in this area (Häbich et al. 2005; Sudhaus et al. 2008). Knopf et al. (2012) were able to demonstrate the research potential of colluvial deposits, which provided evidence for intensive land use in the 9th–10th century AD on the east-facing slopes in the Middle Black Forest. Colluvial deposits are the correlate sediments of soil erosion at the base of hill slopes implying considerable human impact on the landscape (Kadereit et al. 2010). They function as archives and can be studied in order to assess the anthropogenic influence on soil, topography and vegetation, i.e. to reconstruct the landscape (Leopold and Völkel 2007; Vogt 2014).

The research from the last two decades opens the demand for a reassessment of the theoretical concepts of marginal and late-settled areas, since these areas were settled earlier than commonly assumed (Andersson 1998; Coles and Mills 1998; Svensson and Gardiner 2009; Holm et al. 2009; Schreg 2014). In this paper we describe two soil profiles on the western Baar and correlate their colluvial stratification with the archaeological record in order to investigate the continuity of the pre- and early historic land use in this region.

2. RESEARCH PROJECT AND STUDY AREA

The interdisciplinary research project “Favour – Disfavour? Resource development in marginal areas” is within the framework of the Tübingen CRC 1070 “Resource Cultures” (Bartelheim et al. 2015). We use methods from archaeology and soil science in order to investigate pre- and early historic settlement dynamics between favourable and unfavourable regions. One of the objectives is to decipher the period of times during which these regions were developed and what resources were involved in this process. The project seeks to overcome traditional narratives such as conflict situations, demographic pressures and climatic changes as main triggers for movements into unfavourable regions.

The study area extends from the eastern slopes of the Middle Black Forest across the Baar to the south-western part of the Swabian Jura. Due to its continental climate, fertile soils and low terrain intensity the Baar is considered as an old-settled landscape, i.e. “Altsiedellandschaft”. With reference to the agricultural potential of the Baar, both the Black Forest and the Swabian Jura represent unfavourable landscapes, characterized by high annual precipitation (750–1000 mm), low temperatures (4–7 °C) and infertile soils (Siegmund 1999; Kösel and Rilling 2002). Winter and frost periods last several weeks longer compared to the Baar region (Gradmann 1964b: 48–87). Steep slopes and acidic soils are typical for the Black Forest, whereas the high plateau of the Swabian Jura is a landscape mainly dominated by Karst, hence water storage is restricted (Gradmann 1964b: 265–319).
2.1. Research methods

For the archaeological investigation of the study area a database was set up in 2014, based on local archaeological records from State Office for Cultural Heritage Baden-Württemberg and a literature review. It contains 1826 sites covering the period from the early Holocene until the 12th century AD. This database was used to select locations for the investigation of colluvial deposits in the study area. Pieces of charcoal from the colluvial deposits were used for AMS radiocarbon dating. These $^{14}$C ages provide the maximum age of colluvial deposition. Since the locations for the pedological investigations were selected on the basis of archaeological data, we are able to discuss the $^{14}$C ages of the colluvial sediments on a regional level. However, it is difficult to determine the exact kind of land use strategies, which triggered the formation of the colluvia. Thus the term “land use” cannot be specified here.

2.2. Archaeological research in the baar

In the second half of the 19th century the topographer E. Paulus conducted field surveys in the study area. He was able to map several hitherto unknown prehistoric burial mounds as well as farmsteads and roads from the Roman period (Paulus 1882). At the beginning of the 20th century a comprehensive catalogue of the known prehistoric and early historic finds was published (Wagner 1908). After the First World War, P. Revellio led the archaeological research in the Baar until the 1950s. He collected material at construction sites and carried out rescue excavations as well as field surveys (Revellio 1932; Schmid 1991: 22). Between 1932 and 1935 H. Stoll carried out field surveys in the vicinity of Spaichingen and on the high plateau of the Swabian Jura (Stoll and Gehring 1938). In addition, he wrote a manuscript about the prehistory of the Baar, which was not published due to his early death (Goessler 1948: 442). In the mid-1930s E. Fischer discussed the distribution of the prehistoric sites in relation to the favorable and unfavorable conditions of the natural environment (Fischer 1936). On the occasion of the excavation of
the Hallstatt period grave mound Magdalenenberg K. Spindler (1977) published an additional paper on the settlement history. In the 1980s the last comprehensive reappraisal of prehistoric sites, accompanied by field surveys around Villingen-Schwenningen and Grüningen, was done by B. Schmid (Schmid 1991: 22, 75–76). Lately, surveys were conducted between 2010 and 2012 in the vicinity of the Magdalenenberg and Grüningen (Knopf 2012; Knopf and Seidensticker 2012). In the southern part of the Baar the Fürstenberg was systematically surveyed (Wagner 2014).

2.3. Colluvial deposits at the Magdalenenberg and Grüningen

Considering the numerous mentioned archaeological surveys the sites Magdalenenberg near Villingen and Grüningen were chosen to analyze colluvial deposits. Both sites are located in the western Baar, close to the Black Forest (Fig. 2).

The soil profile 1 at the Magdalenenberg is located downslope on the north facing slope of the Magdalenenberg itself (Knopf et al 2015). The soil consists mainly of colluvial material, underlying periglacial material originates from the Lower Muschelkalk. Different colluvial soil horizons point to different phases of human land use. Almost all 14C ages are in accordance with the colluvial stratigraphy (Tab. 1). An exception in this respect is sample Poz-36954. It was taken at a depth of 65 cm, but is older than the sample Erl-20132 from a depth of 75 cm. Since the physical ages of all samples are correct, it seems likely that this older charcoal sample was rearranged, e.g. due to bioturbation. The upper 70 cm of soil show some redoximorphic features and are affected by clay illuviation and the transportation and accumulation of organic matter. The abundance of redoximorphic features increases with depth, which indicates a water influenced horizon. Today the land is used as a mowing meadow, but the 80 cm colluvial deposition indicates more intense land use over the last nearly 6000 years until 1000 years ago (Tab. 1).

Soil profile 8 from Grüningen shows a very similar picture, but is still used for crop production (Tab. 2). It is situated on a southeast facing slope. The soil consists of 120 cm colluvial material with underlying loess (wind-transported silt-sized sediment in a periglacial environment). The underlying geology (upper Muschelkalk, Trochitenkalk Formation) does not influence soil development because it is covered by loess. The charcoal in the deepest colluvial horizon dates to 2472–2278 cal BC (Erl-20137). The time difference to the upper horizon comprises about 2000 years. This difference is also visible in the distinct redoximorphic features of the lower horizon. Two charcoal samples from the same colluvial horizon are contradicting (Tab. 2). The sample MAMS-12277 was taken at a depth of 72 cm and dated to 1620–1500 cal BC. However, sample Erl-20136, which was taken at a depth of 83 cm and is significantly younger, i.e. 2–177 cal AD. During our fieldwork we discovered artefacts dating to 1300–800 cal BC (Urnfield period) in this profile at a depth of 80 cm. Thus the sample Erl-20136 must have been moved by bioturbation downwards into the older colluvial deposit.

Both sites show a long history of land use alternating with periods of extensive land use visible through the differentiation of the horizons.

<table>
<thead>
<tr>
<th>Horizon [FAO 2006]</th>
<th>Depth of Horizon [cm]</th>
<th>Age [uncal BP]</th>
<th>Age [cal AD/BC (95.4%; 2 Sigma)]</th>
<th>Labcode</th>
<th>Sampling Depth [cm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ap</td>
<td>-25</td>
<td>746 ± 33</td>
<td>1221–1290 cal AD</td>
<td>Erl-20131</td>
<td>-25</td>
</tr>
<tr>
<td>Ah1</td>
<td>-60</td>
<td>635 ± 30</td>
<td>1284–1399 cal AD</td>
<td>Poz-36952</td>
<td>34</td>
</tr>
<tr>
<td>Ah1</td>
<td>-90</td>
<td>905 ± 30</td>
<td>1037–1207 cal AD</td>
<td>Poz-36953</td>
<td>49</td>
</tr>
<tr>
<td>Ah2</td>
<td>-70</td>
<td>4970 ± 40</td>
<td>3929–3854 cal BC</td>
<td>Poz-36954</td>
<td>-65</td>
</tr>
<tr>
<td>2Bshg</td>
<td>-80</td>
<td>5071 ± 51</td>
<td>3790–3760 cal BC</td>
<td>Erl-20132</td>
<td>-75</td>
</tr>
</tbody>
</table>

Calibrations were done with OxCal 4.2 (IntCal13)
2.4. Correlation with archaeological data from Magdalenenberg and Grüningen

The medieval 14C-datings from upper horizons of the profile 1 from Magdalenenberg (Mag 1) correlate with archaeological finds and historical records. Phases of high (Poz-36953) and late medieval (Poz-36952 and Erl-20131) land use can be associated with the town of Villingen, which was first mentioned in 817 AD and is close to the site (Jenisch 1999: 35). These deposits may also be related to close-by fortifications from the high-medieval period (Spindler 1979: 371–372; Buchta-Hohm 1996: 122–123). New is the evidence of late Neolithic land use (Poz-36954 and Erl-20132). So far, two Neolithic sites with small finds are known from the immediate vicinity (Fig. 2). In the course of construction works in 1969 several flint implements were discovered less than 1 km to the northeast probably dating to early Neolithic (Schmid 1991: 25). In addition a stone axe was found in 1983, when a farmer prospected one of his fields (Hettich 1984/85). Furthermore, there is a collection with 19 stone axes in the Museum of Villingen. However, the provenience of these finds has not been documented (Schmid 1992: 125–126). While these findings could suggest at best a temporary use of this area, it is now possible to detect an unambiguous phase of land use in the Younger Neolithic through the analysis of colluvial deposits (Knopf and Seidensticker 2012). It seems likely that this land use was accompanied by a long-term existing settlement in the area as well as an increased penetration of the eastern slopes of the Middle Black Forest, which are only a few kilometres away (Fig. 2). This assumption is supported by findings from other parts of the Black Forest. Pollen profiles from the Northern Black Forest indicate a human impact during the Younger Neolithic (Rösch 2009: 342). The surveys of Valde-Nowak and Kienlin (2002: 45–47) provided evidence for an intensified phase of land use during the Younger and Final Neolithic on the western side of the Black Forest as well.

A correlation with adjacent Iron Age settlements has not been possible so far. South of the Magdalenenberg pottery fragments, glass jewellery and so-called “rainbow cups” were collected in the late 1970s and early 1980s, dating to the Latène period (Hettich 1984/85; Weber 1991/92). Another settlement is known from the Gerberstr. 76 in Villingen (Weber-Jenisch 1994). There are two possible explanations for the absence of colluvial deposits from the Latène period in profile Mag 1. The site from Gerberstr. 76 is about 2 km away (Fig. 2). Thus it is possible that the people living there used other fields for agriculture. It should also be borne in mind that the colluvial deposits from Mag 1 only represent the land use from the corresponding slope area on the northern side of the Magdalenenberg. For this reason it cannot be ruled out that the southern slope was agriculturally used during the Latène period. No colluvial deposits date to the Hallstatt period. However, archaeobotanical analysis of sediments from the Magdalenenberg itself revealed that the area was used as pasture land at that time (Fritz 1980: 95–96).

With regard to the mentioned archaeological field surveys profile 8 (Gru 8) from the area west of Grüningen provided surprising results. The medieval colluvial deposit from this profile (MAMS 12275) fits to the earliest historical record of Grüningen from the 12th century (Buchta-Hohm 1996: Tab. 1).

The previous phase of land use during the Merovingian period (MAMS 12276) correlates with contemporaneous cemeteries from the Brigachtal valley (Wagner 1908: 107–108) and Wolterdingen (Buchta-Hohm 1996: 123; Fig. 2).
Unexpectedly, a phase of Roman land use could be detected, sample Ert-20136 dates to the transition from the early to mid-Roman period (Sangmeister 1993: 122). From the nearby area there are no archaeological finds known from this period. The closest Roman sites are located ca. 3–5 km away in Bräunlingen and Überauchen (Thom 1969: 5, 74–75; Fig. 2). However, this colluvial deposit from Gru8
indicates a possible Roman farmstead around Grünigen, which probably was involved in the supply network for the Castrum a few kilometres south in Hüfingen (Mayer-Reppert et al. 1995).

Since the choice of location for Gru8 was oriented towards a potential settlement from the Urnfield period located on the upper slope, colluvial deposits from this period were expected. Indeed the profile revealed a phase of land use from the Bronze Age. Surprisingly the AMS 14C age from sample MAMS 12277 indicates a phase of land use during the 15–17th century cal BC, i.e. at the transition from the early to the middle Bronze Age (Della Casa 2013: 211). This is in contrast to the archaeological evidence for the Bronze Age settlement of this area (Ahlrichs et al. 2016). The closest known sites from the Early Bronze Age are located in the valley of the Danube (Oberath 2000). The same applies to the nearest Middle Bronze Age settlement, located 4 km to the north-east in the Brigach valley (Schmid 1992: 112–123; Fig. 2). About 1.2 km southeast of Gru8 a late Middle Bronze Age burial (Schmid 1992: 11–12) was discovered and excavated in the 1850s (Schmid 1991: 37). Therefore the burial took place at a time when the colluvial deposits already existed. Apart from this site some stone and earth mounds are known from the vicinity, which have not been excavated so far (Knopf et al. 2015). Assuming that land was used in the immediate surroundings of the settlements, there might be at least one settlement dating to the transition from early to middle Bronze Age nearby profile Gru8 (Fig. 2).

Profile Gru 8 does not have a phase of colluviation from the Urnfield period but it contained a deposition of ceramics from this period. It was discovered in 2014, with the base at 80 cm depth and consists of a 16.5 x 15 cm large vessel in which a 6.8 x 7.5 cm small cup was found. No additional artefacts or human remains were found. The intentional deposition of the two vessels is probably related to the contemporaneous settlement in the upper slope area. These kinds of depositions are also known from other settlements from this period (Ahlrichs et al. 2016).

Finally, the thickness of the colluvial deposits from Mag 1 and Gru 8 is not only an indicator for phases of land use. The colluvial stratigraphy also provides source critical information for the question, why there are no archaeological correlates for certain phases of land use, despite the numerous field surveys. The depth of the colluvial deposits shows that the relief intensity is sufficient enough to reduce the visibility of archaeological sites in the field, even if the slope gradient is not high. So far this has only been considered for river valleys with steeper slopes (e.g. Paret 1961: 154–156; Wahle 1973: 2).

3. CONCLUDING REMARKS

The integrated combination of archaeological and pedological methods provides unambiguous evidence for continuous phases of land use on the western Baar, starting at the latest in the Young Neolithic and lasting until the Middle Ages. Considering the archaeological evidence and the colluvial stratigraphies from Magdalenenberg and Grünigen it seems possible that the Neolithic settlement of the western Baar has been accompanied by a penetration into the Black Forest – perhaps for summer pasture. The thickness and the fine stratigraphy of colluvial deposits indicate that even in areas with gentle slopes such as the western Baar, there might be more archaeological sites that are overlain by younger colluvial deposits.

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SEARCHING FOR IDENTITY IN OLD LANDSCAPES – ARCHIVAL PHOTOGRAPHS

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ABSTRACT
Changes in landscape are a constant process, changing in time and character. This process can be positive or negative and can occur homogenously or chaotically. Modern problems with space and landscape are a result of multiple anthropogenic factors - mostly political, cultural, economic and urban transformations. Recognizing and deciphering them is the main problem of modern landscape activities. Archival plans and maps are the main source of knowledge about space transformations, yet they are completed by photography, especially popular since the 1950s. Both documentary photos and family ones, keepsakes, may become a very important source of information about the shape of historical landscapes, their compositions, characteristic elements and local traditions of their inhabitants. Archival photography, useful for historians, ethnographers, geographers and landscape architects, allows for determining the initial shape of the landscape and diagnosing the directions of its transformations.

Keywords
Landscape architecture, archival photography, identity, Upper Silesia

1. INTRODUCTION

Changes in landscape are a constant process, changing in time and character. This process can be positive or negative and can occur homogenously or chaotically. Modern problems with space and landscape are a result of multiple anthropogenic factors - mostly political, cultural, economic and urban transformations. Archival plans and maps are the main source of knowledge about space transformations, yet they are completed by photography, especially popular since the 1950s. Both documentary photos and family ones, keepsakes, may become a very important source of information about the shape of historical landscapes, their compositions, characteristic elements and local traditions of their inhabitants. Archival photography, useful for historians, ethnographers, geographers and landscape architects, allows for determining the initial shape of the landscape and diagnosing the directions of its transformations.

Therefore, this paper is aimed at bringing attention to the usefulness of archival photography in the revitalization process of degraded areas through seeking characteristic features of space that in the process of many years of transformations have become blurred and which might again become an element creating the identity of the place.

1.1. Remarks / Methodology

Analyses will be carried out based on the area of Upper Silesia which dynamically developed in the 19th c. when its landscapes were full of contrasts, surprising industrial structures, areas inhabited by various
social and ethnic groups. Hence it is no surprise that there are so many contemporary photographers interested in this region, photographs of new buildings in local newspapers or historical cities in guidebooks for people eager to learn about this interesting land. From the second half of the 19th century and the beginning of the 20th there are a few interesting albums preserved, presenting new cities, factories, but also country landscapes, folk customs and traditions. Comparative research will focus mainly on the ones included in the collections of Silesian Library and Silesian Museum.

2. COLLECTIONS OF PHOTOGRAPHS USEFUL FOR HISTORICAL ANALYSES

Archival photographs that document the appearance of a specific space can be found in many places and in various forms. These are not only single photographs which can be still found in antique bookshops and antique markets but also rich collections of the Museum of Silesia and other municipal museums\(^1\). Collections in the form of albums play a particularly important role among such documents. However, historic photographs also include postcards with views, illustrated newspapers and trade magazines (e.g. regarding literature) and books with statistical information or for promotional, jubilee character, guidebooks, and monographs of cities as well as advertisements from those times.

The Museum of Silesia has rich collections of photographs (approx. 35,000 photographs\(^2\)) in which the history of Upper Silesia was recorded by many photographers, both professional and amateur. Photographs that present historical events for researchers from that era are as important as those that documented social life, local customs, architecture and landscapes.

A few interesting albums from the second half of the 19th century and the beginning of the 20th century have been preserved, which present new cities, industrial plants as well as rural landscape, folk rituals and customs. Stored at the Library of Silesia, the sets of photographs were taken during various periods (analyses considered those taken before World War II) for various reasons and with varying artistic value. These are always photographs documenting certain features of the space. The oldest of them is Lamche's "Album von Kattowitz" from the 1870s\(^3\), a photographic record of the development of Katowice shortly before being granted town privileges.

Reproductions contained in this album have been used by the city's architecture and culture researchers for comparative analyses, both in specialist research and in popularizing publications. A two-volume album entitled Oberschlesien\(^4\) is a much more diverse collection. It is an extremely interesting collection of thematically-arranged prints (e.g. landscapes, castles, customs, miners, mines etc.). The size and layout of its individual parts, the format of photographs and their artistic quality and the condition imply that the photographs were not taken by one photographer; they are instead a collection of systematically accumulated items. Many of them were reproduced in newspapers or postcards. The presented places and people imply that they were created during the interwar period, stamped pages of some cards indicate the ordering party: Amt für Kulturpflege des Ober und Niederschlesien with its registered office in Breslau. Personal reasons were behind the creation of the next album entitled: Piękno i rozwój Siemianowic Śląskich (Beauty and development of Siemianowice Śląskie), by Franciszek Vogt, photographic amateur from Siemianowice Śląskie\(^5\). He wrote in the introduction to the collection which he gave to the city in 1936 that it was created due to the need to: show citizens the beauty of individual fragments of our town and present evidence of the town's development to next generations. Phonographs included in it are of poor quality, often underexposed, out of focus, poorly framed and partially signed. However, the emotions they contain (Wieczór w Pszczelniku) and the record of the social structure (Willa Pana Krajuszki) gave them a variety of meanings. The last album is Das Schöne Oberschlesien, a typical collection of landscape reproductions\(^6\).

The most important static and reporting publications include: Der Arbeiterwohnungswesen in der Oberschlesien Montanindustrie, by Kurt Seidl, mining assessor ordered by Oberschlesischen Berg- und
Hüttenmännischen Verein in 1913 (Seidl 1913). Apart from the descriptive part and figures, it contains a large number of photographs illustrating the most interesting solutions regarding workers' housing estates. A booklet published by Berkwerkgesellschaft Georg von Giesche's Erben written by Hermann Reuffurth, entitled *Gieschewald ein neues oberschlesisches Bergarbeiterdorf*… was intended to be an advertising publication (Reuffurth 1910).

Illustrations in the form of photographs from the turn of the 20th century were also used in other conventions. Those were in the form of local magazines (e.g. *Oberschlesien im Bild*), calendars (e.g. *Illustriertes Jahrbuch*) or guidebooks (e.g. *Reiseführer durch Oberschlesien*). In these cases, however, they supplemented the main test; their copying and mass production resulted in poor quality, often small size and, as a result, have a limited usefulness nowadays.

Postcards with views are the last group. Various techniques were used to create them, including photography. Copies were made using the photocopying technique as well as in the form of prints on thin photographic paper. The same photographic plate was used for several projects, and color was added manually to photographs; they were also retouched and decorated with lithography. Postcards with views were meant to be beautiful and to show beautiful places, and that is why they showed Upper-Silesian landscapes, mines or ironworks presenting colorful and idyllic scenery. This does not reduce the importance of the postcards that were so popular at that time and which are currently of interest to collectors as well as for a broad group of researchers of cultural phenomena.

3. UPPER SILESIAN LANDSCAPE IN OLD PHOTOGRAPHS

In cities such as Warsaw or Krakow, photographers wanted to capture their picturesqueness, beauty and monuments determining their uniqueness, value and history. Both details and panoramic views were mostly the domain of local artists, who were patriots and community activists who had been connected with the city for generations.

Upper Silesian specificity of the place also resulted in a certain specificity of documenting endeavours. In the 2nd half of the 19th century, photographers were often travelers as a result of political, social and economic conditions. Photographs were ordered by officers, directors of industrial plants, publishing houses; so, for accurately specified documentation, much more rarely for artistic reasons, there was the willingness to capture a beautiful or transient phenomenon. However, the former group cannot be denied aesthetic and technical value. Their main objective included the presentation of the development of industry in distant Prussian lands, documenting the introduction of reforms, progress of technological thought, cultural and social transformations. They were intended for documenting but also for propaganda and advertising purposes. Therefore, vast panoramas with views of cities, plants and patronage housing estates, which in colour and retouched were used for postcards as well as new machines and individual production areas of industrial plants.

Topics can be divided into several main groups: ethnographic, open spaces and villages, new facilities in the infrastructure (in particular railways), traffic routes (also waterways, e.g. Kłodnicki Canal), boulevards and pedestrian precincts, new public utility buildings and the industrial plants mentioned above. In historical cities, mostly monuments were photographed (Gliwice), while in young cities (Katowice) - presentable villas, fashionable restaurants and hotels.

In architectural and landscape photography, types of approaches to a given topic varied, however, a few typical and particularly willingly used approaches can be distinguished. Cities, patronage-housing estates, industrial plants were photographed as panoramas, usually with a broad open area in front. Attempts were made to take bird's eye views of urban layouts. Heights, taller buildings and, in particular, church towers were used for this purpose. The development of this technique also allowed for the development of aerial view photos - photos taken aboard planes and airships. Streets, on the other hand, were presented from
the perspective of the street axis or slightly from the side at human-height level. Single buildings were photographed at an angle from the street level or en face: larger complexes, also at an angle or in a panoramic view. Architectural objects were framed tightly while broader views were in accordance with the triple division principle. The most important view was usually placed in the middle.

4. ARCHIVAL PHOTOGRAPHS IN LANDSCAPE STUDIES

One of basic features of photography is presenting the past. Regardless of whether it was taken yesterday or one hundred years ago, a photograph records a situation that no longer exists. While viewing all photographs of architecture and landscapes, we have various impressions, which on many occasions distract our attention from the perceived clear recording. The main imposing impression is a lack of certain elements, often the openness of an undeveloped landscape, its considerable uniformity and cleanliness of city interiors, the layout of architectural objects. Techniques of photography enhance this impression by the lack of moving persons. Objects created in subsequent years fill in a given space - it is a typical feature of development, a process in a positive approach. An excessive number of objects can be observed on fewer occasions. Their layout in the space is then evaluated in categories of the beauty of former buildings or landscapes.

This feature mostly applies to composed greenery, which often appears in the images of parks, squares or boulevards as well as residential gardens. Their current absence causes concern and a willingness to find out the reasons for the transformations of a given space. Another important feeling from a person looking at archival photographs is a sense of embarrassment, loss, disorientation, especially when the image shows city space. We look for reference points, facilities that we know and that we try to localize in a contemporary version of this space. Photographs with people, especially with large numbers of them, distracts our attention from the features of the space; we focus on watching the situations that have been immortalized in poses, the clothing of the photographed people and the reason for taking a given photograph. The landscape background is an addition, setting in this case.

Drawing our attention from the documenting nature of photographs results in their frequent underestimation during works connected with the restoration of the space, restoration of greenery layouts, conservation work in historical buildings, landscape studies and analyses concerning the identity of the place.

Photographs were particularly useful in the post-war period in works related to the reconstruction of architectural buildings. At present, valid conservation doctrines do not support full reconstructions of buildings; however, analyses of photographic documentation are very useful for reconstructing certain elements. Also, in the creation of spaces providing information about a given object, whether it exists or not, its images are used to prepare models, digital models using digital photogrammetry. Flat images are used more often (which present its most important features and history), which are copied as various printed, engraved or milled plaques.

In landscape and urban research, former panoramic and perspective views of cities or city interiors are used for locating them in the space (together with archival and contemporary cartography) of objects, which no longer exist or have been heavily transformed. But they can be used also for landscape research, especially for views. In the era of digital modeling, a model of a given space is often prepared, usually on the basis of former photographs or maps. Specification of the place from which a given photograph was taken also allows for the location of view connections and vantage points that no longer exist.

In the research on the historical analyses of layouts of greenery, information contained in photography is used for performing specific analyses. They are used in historical and composition studies for defining transformations or distinguishing further style stages of the layout. Thorough analysis of the photographs makes it possible to reconstruct a composition system, mostly the layout of paths and the greenery.
system. In composition studies, on the other hand, it makes it possible to define former spatial connections between individual objects, defining former interiors and composition axes and view connections (active and passive exposure).

As in the cases mentioned above, photographs can allow for a preliminary location of the occurrence of non-existing objects and the definition of their characteristic features, details or materials from which they were built. A similar procedure is used for small architecture and garden equipment. However, the most valuable information is contained in old photographs concern greenery. Archaeological and dendrological research conducted in historical gardens cannot be used in gardens from the turn of the 20th century. Such gardens are predominate in Upper Silesian cities. Due to their nature, short history and frequent transformations, the aforementioned research does not work. On the basis of postcards with views or photographs, the species composition used in a given area can be established. Also, in the case of difficulties in determining the age of trees (growing in atypical conditions, e.g. urban, industrial conditions, by traffic routes, also for non-existing systems), these materials (in combination with traditional in situ research of trees) are very useful (Łakomy 2011: 144-151).

Archival photographs can be also used for comparative analyses when no documentation of a given object is available. Specification of its original intended use, the date of creation, the designer or general style together with illustrating material documenting the appearance of similar objects created at the same time (in particular, designed by the same author) should be the starting point for the recomposition concept. Examples of such actions are the garden by the Caro Villa in Gliwice (Rostański 2001: 113-121) on the concept of the restoration of Park Ludowy in Bytom (Zachariasz 2012: 75-98).

Unfortunately, despite photographic documentation that is often very rich, authors of design concepts for historical buildings do not take it into account, which results in erroneous solutions, both in composition, the selection of the forms of vegetation, small architecture and surface materials.

5. CONCLUSIONS

The potential of archival photographs in landscape research is not fully used at present. Its main application involves conservation documentation and historical and composition studies for historical greenery layouts. A landscape that is often caught “by accident” becomes a source of a great deal of significant information about the appearance of a given space, its characteristic features, former identity, which are also related to the principles for composing them. In particular, it can be used to reconstruct erased systems - paths, engineering forms, elements of small architecture and greenery. Accurate analyses of photo-

Fig.1. Former Villa form Julius Haase in Katowice  a. fragment of archive postcard (from Upper Silesian Museum collection), b. present state, photo. K. Łakomy 2015.
graphs, gardens, often make it possible to get to know a general species composition, forms of vegetation, its age, the materials used and details of accessories, such as sculptures, fountains, benches or gazebos. Archival photographs should be considered for all work connected with historic landscape. Not only in studies but also in design, allowing not only sufficiently complete reconstruction of a given space but in the reconstruction of its characteristic features, traditional forms, creating an experience for its users, typical of historical and cultural conditions.

NOTES
[1] e.g. Museum in Gliwice has an enormous collection of Jerzy Lewczyński’s artistic works.
[4] Oberschliesien (b.a), (b.w), (b.d) before 1939, Special Collections of the Library of Silesia, ref. G 455 III.
[9] Reconstruction of Warsaw, Royal Castle, Wawel. Historical and political conditions of Upper Silesia resulted in a small number of such actions.
[12] Examples of improper restoration of gardens are works performed at Julius Hasse’s villa in Katowice in Warszawska Street (Fig.1.) and by the former Park Villa in Chorzów on Sobieskiego street, where, despite very comprehensive photographic documentation, the created concepts do not refer to the traditions of this place in any way, thus reducing the value of the entire villa and garden complex, diverging from the historical character.

BIBLIOGRAPHY
A PRESERVATION METHOD OF JAPANESE BORROWED SCENERY GARDENS. WHAT WE SEE AND HOW WE SEE MOUNTAINS IN KYOTO

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ABSTRACT
The Kyoto city has been tried to protect the city landscape since 1930s. Despite these efforts, beautiful landscapes have been lost little by little. Even the Japanese borrowed scenery gardens lost their aesthetic beauty by the city development. Kyoto city issued the Landscape Plan in 2005 and amended the landscape Act in 2007 to protect such valued landscape. However, only one borrowed scenery garden is selected. Therefore, the focus of this paper is to discuss the preservation of Japanese borrowed scenery gardens. To propose the methodology of the preservation, the objectives in this research are to review the current landscape regulation in the Kyoto city, to discuss the spatial relationship and visual relationship of borrowed viewed gardens and viewed mountains, to present case studies, and to propose the preservation method.

Keywords
Preservation, Japanese Garden, Borrowed scenery, View, Kyoto

1. INTRODUCTION

Kyoto has been famous for the old capital in Japan and remained many shrines and temples since 794 A.D. The capital place, where is a plain surrounded by mountains on the north, east, and west and opened to the south, has been selected according to Feng Shui principle and the city was coordinated with grid pattern. The imperial palace was placed at the center and noble family residences were planned to construct in the surrounding area. However, many of nobles prefer to build their villa or estate outside of the city limit where is near mountain, because Japanese people found beauty from nature, such as mountain, river, grass, tree, flower, bird, wind, and moon. Among of all, attitude toward mountain is rather special. In fact, most of Japanese old cities locate the plain surrounded by mountains and the views to and from mountain has been respected. Kyoto is no exception that the many of famous shrines, temples, and garden distribute to the mountain side rather than in the city limit. Especially the famous gardens are distinctively located near the mountain and have a great view to the mountains. This visual structure is particularly known as “shakkei” in Japanese, “borrowed view” in English and this unique visual structure make Japanese garden famous in nationwide in modern times. As a result, it may say that borrowed view gardens represent a sense of Japanese aestheticism now. In spite of the popularity, the view structure is less known and the preservation method is not established enough. As a result some garden owners confront the difficulty to preserve the view to the mountain now and some gardens have been already lost their view such as Tojiin Temple in Kyoto. To prevent the destruction of our historical landscape, we have to find the way to preserve the scenery to the mountain.
One reason why we could not preserve such a particular view is the lack of understanding of spatial relationship and visual relationship between a garden and a mountain. And another possible reason is that the present governors and planners overestimate the contemporary perception and attitude and underestimate to the past.

Therefore, this paper is focused on the borrowed view gardens in Kyoto city. The objectives are to: 1) briefly review current regulation in the Kyoto city, 2) discussed the view points and viewing area of the borrowed view gardens, 3) present example of case studies that attempt to identify the spatial and visual relationships, 4) suggest the methodology of finding preservation areas.

2. REVIEW OF CURRENT REGULATION

Kyoto city issued the Landscape Plan in 2005 and amended the landscape Act in 2007. From this amendment, particularly the building height control is added to protect perspective and borrowed landscapes. The methodology is shown in section five of chapter three of the Landscape Plan. According to the Landscape Plan in 2007, 38 view points were selected and three landscape conservation zones based on the distance from the view point are delineated (The Landscape of Kyoto, 2007).

2.1. The characteristics of view points

The view points are categorized eight types according to functional spaces which are temple, shrine, palace, castle, garden, street, waterfront, and mountain (Table.1).

2.2. The characteristics of landscape conservation zone

Three different types of conservation zones are established depending on the functional space and the types of view.
(1) Short Distance View Design Conservation Zone
   This zone is designated within 500m from a view point. The zones are regulated structure form, design, and color to preserve the perspective view. All of the viewpoints are selected for this zone.
(2) Perspective Space Conservation Zone
   This zone is designated within 3000m from a viewpoint. The zone are regulated the height of structures above sea level. Eight view points are selected (Figure 1 and 2).
(3) Distant View Design Conservation Zone
   This zone is designated within the city limit. The zone are regulated the color of walls and roofs of the structures to preserve the perspective view. Nine viewpoints are selected

3. DISCUSSION

The following is focused on the previously introduced (2) Perspective Space Conservation Zone, because this zone is regulated the building height and highly influence the borrowed view gardens.

3.1. The lack of view points

According to the current regulation, only one view point out of eight is the view from garden to the mountain has been selected, and the others are the views from river or street to the landmarks on the mountain (Figure 3). These viewpoints can be considered current important view points, however there
are several borrowed view gardens in Kyoto city are existed. Unfortunately some borrowed view gardens are disappeared or forgotten and considered less important in the current recognition. Kyoto city suggest discovering more view points to the citizens. This may be effective only to find current environment and less effective for finding from the past.

Table 1. View points of the Landscape Plan in 2007

<table>
<thead>
<tr>
<th>No.</th>
<th>View points</th>
<th>Category</th>
<th>Viewing objects</th>
<th>Short Distance (0-500m)</th>
<th>Perspective</th>
<th>Distant (&gt; 500m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kamowake-ikazuchijinja(Kamigamojinja)</td>
<td>shrine</td>
<td>○</td>
<td>○</td>
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<td>○</td>
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<tr>
<td>2</td>
<td>Kamomioyajinja(Shimogamojinja)</td>
<td>shrine</td>
<td>○</td>
<td>○</td>
<td></td>
<td>○</td>
</tr>
<tr>
<td>3</td>
<td>Kyom-gokokuji (Toji)</td>
<td>temple</td>
<td>○</td>
<td>○</td>
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<td>○</td>
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<tr>
<td>4</td>
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<td>○</td>
<td>○</td>
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<tr>
<td>5</td>
<td>Daioji</td>
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<td>○</td>
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<tr>
<td>6</td>
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<td>Saihoji</td>
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<td>21</td>
<td>Streets in Preservation district for groups of historic buildings in Sanneizaka</td>
<td>street</td>
<td>○</td>
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<tr>
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<td>Honkawa, Ujigawaharu</td>
<td>river</td>
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<td>Sosui</td>
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<td>Entsuji</td>
<td>garden</td>
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<td>25</td>
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<td>garden</td>
<td>○</td>
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<td>Higashiyama from the rightbank of the Kamogawa</td>
<td>river mountain</td>
<td>○</td>
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<td>27</td>
<td>Kitayama from both banks of the Kamogawa</td>
<td>river mountain</td>
<td>○</td>
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<td>28</td>
<td>Nishiyama from the left bank of the Katsuragawa</td>
<td>river mountain</td>
<td>○</td>
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<tr>
<td>29</td>
<td>“Daimonji” from the right bank of the Kamogawa</td>
<td>river mountain</td>
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<td>○</td>
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<td>30</td>
<td>“Ho” from the left bank of the Takanogawa</td>
<td>river Landmark</td>
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<td>○</td>
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<td>31</td>
<td>“Myo” from Kitayama-dori</td>
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<tr>
<td>32</td>
<td>“Fune” from the left bank of the Kamogawa</td>
<td>river Landmark</td>
<td>○</td>
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</tr>
<tr>
<td>33</td>
<td>“Tori” from the left bank of the Katsuragawa</td>
<td>river Landmark</td>
<td>○</td>
<td>○</td>
<td></td>
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<td>34</td>
<td>“Hidari Daimonji” from Nishioji-dori</td>
<td>street Landmark</td>
<td>○</td>
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<td>35</td>
<td>“Daimonji”, “Myo”, “Ho”, “Fune”, “HidariDaimonji” from Funaokayama Park</td>
<td>mountain (park) Landmark</td>
<td>○</td>
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<tr>
<td>36</td>
<td>Kamogawa from the bridge over the Kamogawa</td>
<td>river</td>
<td>○</td>
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<tr>
<td>37</td>
<td>Arashiyama area from the downstream of the Togetsukyo</td>
<td>river (bridge) mountain</td>
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<tr>
<td>38</td>
<td>Urban area from Daimonjiyama</td>
<td>mountain city</td>
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</tbody>
</table>
3.2. Selection of the view points

The most of viewpoints are selected because simply the landmarks can be seen in the current environment. Consequently, rivers and streets are more likely to be selected, because they usually possess the better clearance due to the Right of Way. Those viewpoints may satisfy the people of today. The riverbank was one of the viewing places in the past. The structures with widely opened windows are constructed along the river are shown on the left of Figure 4. Wooden decks called “Yuka” are installed in the riverbank or delta area (Figure 4:Right). These are typical in Kyoto in Edo period and the tradition still remains in some area in Kyoto.

On the other hand the mountain views from the street are merely seen in the past. Selecting viewpoints is relatively new recognition and the least attractive view points. To maintain the current limited view, the viewpoints on the street may be necessary, however the austenitic view point is required to discover from the past and sustain for the next stage.
3.3. The conceptualization of view area

Since the view objects are mostly limited to the landmarks, the methodology seems to only adapted for the mountains which has landmarks. For example the preservation area from Entsuji temple garden is digitized on the map but the method is not described enough.

4. CASE STUDY

In this chapter, the purpose and objective is to attempt to identify the view points from the past documents and delineate viewing areas using the ridge and valley line, and explore the possibility to apply the proposed methodology for the regulation.

4.1. Finding the Possible view points

I mentioned previously that the current regulation is useful for sustaining current environment, consequently we need to explore retrospect views. Thus, the following is finding the possible viewpoints from the past records. Fortunately there are many historical guide books of gardens in the Kyoto city. One of the famous guide books is called "Meisyozue", which is a series of guidebooks written about the famous places, such as temple, shrine, and gardens with detailed illustrations. Most of "Meisyozue" were published in the late Edo period (1603-1868). One of the serieses of "Meisyozue" called "Miyako Rinsen Meisyozue" by Rito Akisat and Soen Sakum (ed. Shirahata, 1999). Rinsen means garden in Edo Period, so this particular guide books is mainly written about famous gardens (Rinsen) in Kyoto with detailed drawings. "Miyako Rinsen Meisyozue" is refered as the Data Source 1 in this paper. From Miyako Rinsen Meisyozue, 20 borrowed gardens were found. In this point gardens are selected if a mountain(s) is remarkably illustrated with the name or written in the text. In addition to Miyako Rinsen Meisyozue four famous borrowed view gardens are selected from "Nihon Teienshi Taikei" (Shigemori, 1971). Nihon Teienshi Taikei introduces the remained traditional gardens, and published in 1971 with surveyed drawings. "Nihon Teienshi Taikei" is refered as secondary (Data Source 2) in this paper. Four gardens are added to for representing garden in Edo period (Table 2).

4.2. Finding a viewed mountain

The 16 viewed mountains are identified according to drawings and written documents (Table 2). Figure 6 shows that the viewed mountain is distributed mostly in eastern area of the city. Kyoto city is surrounded
by mountain range. In particular, the eastern mountains are the nearest mountains from the city district (Heiankyo), and a number of temples are located in the eastern area. The eastern mountains are consisted of 36 mountains and ridges. Therefore, viewed mountains and the spatial and visual relationship with the garden are described in the eastern area.
The spatial relationship of the mountains and gardens in the east area is similar except Mt. Hiei and Mt. Otoko. The distance from gardens to mountains is between 150m to 250m and the elevation of mountains is around 200m (Table 3). However the visual relationships are quite different. Since the terrain of eastern mountain range is complicated, a variety of views are created. The views are classified into three types.

The type A is the most simple and common pattern, which is a certain mountain is viewed from a certain borrowed garden (Figure 7:Upper left). The second type B is multiple mountains are viewed from...
The Type C includes the spatial patterns which the mountain is viewed from the same direction (Figure 7: Lower left) and from different directions (Figure 7: Lower right).

(1) Type A: a certain mountain is viewed from a certain borrowed garden. Jisyouji temple, Tofukuji temple, and Senyuji temple are the example of this type in the eastern area. Jishoji Temple known as Silver Pavilion is Zen temple, and locates near from Kyoto's eastern mountains.
A PRESERVATION METHOD OF JAPANESE BORROWED SCENERY GARDENS

(1) Type A: one mountain is viewed from a certain garden

For example, Hojyo and the other is Sho-Hojyo. Three mountains are viewed from Hojyo (Figure 9: Top), and four mountains are viewed from Sho-Hojyo (Figure 9: Bottom. Kodai-ji Temple is at the foot of Higashiyama Ryozen Mountain in Kyoto, and officially called Kodaiji-jushozenji Temple. The temple was established in 1606. The temple contains the mausoleum of Toyotomi Hideyoshi (1537-1598), who unified Japan. Statues of Hideyoshi and his wife are enshrined here. Sho-Hojyo (secondary building) was burned in 1789 and not rebuilt, although Hojyo (main building) was rebuilt 1912 after several fires. The gardens are not remained as the original form, but the view to the mountain is partially remained. Three mountains, Ryojyusen (Ryozen), Hakusan (Kodaijiyama), Syogunzuka (Kacyoyama), are identified from. In addition to three mountains, Otowa Mountain is drawn in Figure 9 at the bottom.

(2) Type B: several mountains are viewed from a certain garden

For example, Kodaiji Temple owns at least two borrowed view gardens existed in Edo period, one is Hojyo and the other is Sho-Hojyo. Three mountains are viewed from Hojyo (Figure 9: Top), and four mountains are viewed from Sho-Hojyo (Figure 9: Bottom. Kodai-ji Temple is at the foot of Higashiyama Ryozen Mountain in Kyoto, and officially called Kodaiji-jushozenji Temple. The temple was established in 1606. The temple contains the mausoleum of Toyotomi Hideyoshi (1537-1598), who unified Japan. Statues of Hideyoshi and his wife are enshrined here. Sho-Hojyo (secondary building) was burned in 1789 and not rebuilt, although Hojyo (main building) was rebuilt 1912 after several fires. The gardens are not remained as the original form, but the view to the mountain is partially remained. Three mountains, Ryojyusen (Ryozen), Hakusan (Kodaijiyama), Syogunzuka (Kacyoyama), are identified from. In addition to three mountains, Otowa Mountain is drawn in Figure 9 at the bottom.

(3) Type C: a certain mountain is viewed from multiple gardens

Historically, aesthetically, and spatially significant mountains are desired to view from many temples. Mt. Hiei, Mt. Kodaiji, Mt. Nanzennji, Mt. Ryozen, Mt. Kiyomizu, Mt. Otoba, Amidagamine (mountain ridge), and Mt. Otoko, are viewed from multiple gardens. These mountains are characterized the appearance,
historical event, spatial position, and direction. The appearance is one of the important factors to be selected. The apparently isolated mountain like Mt. Hiei is distinctive from the most areas. In addition to the appearance, the aesthetic beauty is also the reason to be selected. The mountain with historical event is also respected, such as private cremation place for a well known person, or public cremation place for ancient people. The spatial position of a mountain and a garden is fundamental. The gardens are placed according to the aesthetic value and landform. Japanese temples are frequently located at the foot of a mountain and the mountain which is situated the behind of temple is called the temple name or simply “ushiroyama”, which means mountain behind. On the other hand, most of temple has a mountain name with a temple name as a formal name. For example, the formal name of Kiyomizudera is Otowasan Kiyomizudera, and Syohoji is Ryoujyusen Syouhou-ji. Otowasan and Ryoujyusen are both “ushiroyama” of two temples, contributing to the spatial position as well.

4) Others

Generally approximation to the mountain is important aspect for the garden due to the visibility, accessibility, psychological stability by the landform. There are some exception like Mt. Hiei and Mt. Otoko (Yamazaki). These mountains are viewed from more than 1km far from the gardens, consequently, the spatial relationship is low. However, the religiously important mountains like Mt. Hiei and Mt. Otoko are desired to be connected visually. The visible place is considered a valuable place without the approximation to the mountain.

The Mt. Hiei is the highest mountain in east area and located the northernmost of the eastern mountains. The orientation of Mt. Hiei is important for people who believe Feng Shui principle. The north east is generally believed unlucky direction in terms of the natural energy flow. People believe that the existence of the Mt. Hiei can avoid the misfortune to the city, so Mt. Hiei is awed and worshiped.

The aesthetics of mountain shape attracts people as well. This results to be selected as borrowed view mountain. Mt. Hiei is viewed from three gardens, which are Daitokuji Hojyo, Entsuji Temple garden, and Shodenji Temple garden. Unfortunately, Mt. Hiei cannot be seen from Daitokuji Hojyo now, but can be seen from other two gardens.
Daitokuji Hojyo garden locates the plane area, although other two gardens are locates mountain area. The borrowed view gardens where locates the plane area are more likely to be disturbed the view and more difficult to preserve the view.

4.3. Find a possible area for the preservation

Using a viewshed is one of the effective ways to find the visible area from a given point or points. However, some possible risks to apply for the preservation. One is only effective if the view point and viewing object or area is defined. And the other is the visible area calculated from viewshed is the minimum area for the preservation. Although, this may help to confirm whether the selected area is covered enough for the preservation.

(1) How to define the area of a mountain.

Elevation is the common measurement to define mountain, but the area cannot be specified. Topography gives us the information of landform. The professionals such as a cartographer or a landscape architect can define a mountain area by carefully reading the topography. The degree of slope is useful measurement to define plane to mountain area however, the individual mountain cannot be identified. Geology is possible to define the individual mountain area, but possibly useful for macro scale rather than micro scale. Above all of information is substantial but need to be simplified. Therefore, to define a area of mountain, two basic components, ridge line and valley line, are hypothesized to define the area of mountain.

(2) Findings of Valley and Ridge line

An aspect is one of the useful information to find the ridge and valley. Usually the aspect is identifiers of the slope direction, and is expressed in positive degrees from 0 to 360. The aspect is easily calculated by the GIS software. The only problem is that the result is rather complicated and the assumed area has to be selected manually.

The watershed is calculated by the similar methodology comparing with the aspect. A watershed is used to find a landform of a basin where surface water is collected, and is determinate by the high points and ridgelines. The combination of watershed area and stream line is possible and the simpler way to find a mountain area.

5. SUGGESTED PRESERVATION AREA

The mountain area is identified by the watershed area and stream line (Figure 11). The validity is confirmed by comparing with the viewshed area, the methodology is applicable for the most part. The most of viewpoints are covered by the watershed area, however, some viewpoint such as the view points (1, 21, 22) are not covered by the preservation areas. The reason is the distance from the garden to mountain is long. The distance is over 10km. These gardens need a special treatment such as the combing with the current regulation to preserve the long vista.

In this study, the research area is within the city boundary, however, some area like Yamazaki (Mt. Otoko) is viewed from at least two gardens. The distance from gardens to the mountain is more than 18km and the view transcends the boundaries. The long distant view is easily disturbed with a little physical...
change around the view point and disturbed view is eventually forgotten. In the case of Yamazaki is no exception. In addition to the endangerment, the current regulation is limited the distance within 3000m for the Perspective Space Conservation Zone. To protect and develop, such view is preserved as potential view for the future generation.
6. CONCLUSIONS

This paper is focused on the methodology of borrowed view gardens in Kyoto city. The followings are discussed from the review of the current regulation in the Kyoto city.

(1) Several borrowed view gardens are not selected for the conservation plan
(2) The gardens which are disappeared and forgotten in the past are not included for the current regulation.
(3) The viewed mountains and their areas are not clearly defined

In these circumstances, the method of finding the view points and viewing area of the borrowed view gardens are discussed by presenting some examples of case studies. Meanwhile, the spatial and visual relationships of borrowed view gardens and viewed mountains are identified. As a result, the following visual relationships are revealed: (1) a certain mountain is viewed from a certain borrowed garden, (2) multiple mountains are viewed from a certain garden, (3) a certain mountain is viewed from multiple gardens. Lastly, suggested methodology of finding preservation areas is presented.

NOTES
Note. Figure 3, 4, 8, 9, 10 are from the above site

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LANDSCAPE, POWER AND SETTLEMENT DYNAMICS.
NOTES ON ARCHAEOLOGICAL METHODS BY MEANS OF EXAMPLES FROM THE NORTHERN RHINELAND, GERMANY

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ABSTRACT
In the last decades, evidences for settlement continuity in the rural space of the Northern Rhineland from late Antique to Early Modern Times are increasing. Focused on the Rhenish open cast lignite mining area, it will be discussed whether new semiotic and performative approaches in German landscape archaeology will come to convincing explanations for places enduring fundamental societal and economical changes. Special attention will be paid to the strategies of local rulers to legitimate their power symbolically and by means of rituals and performance. Most of the places, engrossed by the local elites, had religious meanings in a broader sense which were used to legitimate power. New elites or local leaders in weak positions in times of crises required symbols of power to legitimate their unstable social position. A common strategy was to refer back on ruins and old symbols of power to construct traditions and myths of origin. Therefore, places with particular symbolic meanings had a stabilising effect on settlement structures, especially in times of crisis.

Keywords
rural space, power, settlement continuity, spatial turn, religion, semiotics

1. INTRODUCTION

Doubtlessly, research of settlement continuity and discontinuity has a long tradition in Rhenish archaeology. Much attention has been paid to the transformation of the former Roman provinces from Late Antique to Early Medieval Times (e.g. Ament, 1995; Schmauder, 2012). Especially reasons for discontinuity have been discussed in medieval research of deserted villages (e.g. Janssen, 1975). In the last decades gradually more attention has been paid to the rural dynamics in the hinterland of the formatting towns in the High and Late Middle Ages and to the formation processes of large nucleated villages (see below).

In the English speaking areas the symbolic reference to relicts of past cultures has been suspected as a possible reason for settlement continuity for several decades (e.g. Effros 2001; Williams 1997). In contrast, most German scientists tended to physical explanations for the persistence of settlements over several epochs, like the continuity of property rights, natural location factors or the utilisation of ruins to gain raw materials (e.g. Eismann 2014; Grunwald 2002; Kunow 1994). Symbolic explanations for the phenomenon only gradually gain more attention. (e.g. Clemens 2003; Steuer 2014).

In contrast to the „practical“ interpretations of continuity, there is an ongoing debate about the semiotic and symbolic dimensions of landscape archaeology. The main influences on the German debate are the so called spatial turn and performative approaches in the cultural sciences (Gramsch, 2003; Meier, 2009), however the debate is less influenced by the post-processual archaeology (Fleming 2006; Thomas...
2012). According to that new perspective, landscape is understood as socially constructed, whereat places become meaningful through actions of certain groups. The ability to create meanings is at least a question of power.

Regarding the Northern Rhineland, the question arises, why rural settlement structures were often very long lasting. The sites often persisted fundamental social and economical changes like the end of the Roman provinces. It shall be examined, whether the newer approaches in landscape archaeology can lead to more convincing explanations for long-term settlement continuity. Therefore a closer look shall be taken on strategies of power legitimation, the construction of traditions and myths of origins.

2. SETTLEMENT CONTINUITY IN THE RHINELAND FROM LATE ANTIQUE TO EARLY MODERN TIMES

There is no doubt about the continuous occupation of the Roman towns Cologne and Bonn till Antiquity (e.g. Müssemeier 2012; Ristow et al. 2002). Moreover, the Merovingian cemeteries in the vicincity of the cathedrals of Xanten and Neuss are indications for continuity also in this towns, although the character of the settlements doubtlessly changed fundamentally (Siegmund 1998: 246–267; 332–334; cf. Theuws/Bijsterveld, 2015: 88–89). Besides the Roman towns, vici like Jülich oder Zülpich outlasted till today, insofar they were fortified or even next to forts (Ament 1995). However the state of research about the settlement continuity of rural unfortified vici or villae rusticae is much more fragmentary. Recent research could show that even a considerable number of these sides were still occupied in Merovingian Times (Müssemeier 2012: 44–52; Nieveler 2003: 197–182). But it is seldom clear whether these places were continuously used or reoccupied after a more or less short break.

For the Merovingian Times the question can be raised, whether the rural sites were still stationary or constantly shifting. H. Steuer (1988) supposed, that settlements in South-western Germany, Northern Germany and Jutland moved steadily till the 10th/11th century. In contrary R. Schreg (2006: 318–321) assumes continuous occupation of the modern village centres till the late Merovingian Times. Likewise F. Theuws (1999: 340f.) describes the formation of constant dwelling sites in the Kempen-Region, Netherlands, for the same time.

As K. Böhner (1958a: 329) stated out, the Merovingian cemeteries in the Moselle-region around Trier were not further away from the next modern village than a few hundred meters. Although there is not many evidence for the northern Rhineland, the situation is similar on first sight (cf. Nieveler 2003). Probably the settlements were not far away from the appendant burial grounds and therefore it is at least thinkable that the Merovingian dwellings were situated in the area of the modern villages (cf. Hoeper 2001). Another argument against the theory of shifting villages in the Rhineland is the fact, that almost no abandoned settlement sites of the Merovingian and Carolingian Times are known (Janssen 1975: 189–219; Nieveler 2003).

For the Middle and Late Merovingian Time more reliable conclusions are possible concerning continuity or discontinuity in the rural space of the Northern Rhineland: Several modern village churches have predecessors tracing back into the 7th/8th century (Ristow 2007:82–102; Ahrens 2001: 77–81). Some of them were build in Merovingian cemeteries dating even back to the 5th/6th (cf. Böhme, 1996: 479) (fig. 1).The number of abandoned villages was increasing since the 13th century. But that does not mean that whole areas were deserted, it was often a processes of concentration – firstly around the numerous formatting towns in this time and secondly inside the single parishes in particular around the churches (Janssen 1975: 219–226; Schreg 2006: 288–294).

As an opposing trend, the rural lower nobility began to build castles outside the peasant settlements till the 12th/13th century (Andermann 2009; Friedrich and Pääfgen 2007). With no doubt, this was a break in continuity and tradition that have to be discussed in detail below.
Although there are a lot of scattered examples of settlement continuity in the Northern Rhineland, there is a lack of well explored micro-regions where long-term processes can be analysed in detail. One exception is the village of Pier and its surrounding localities in the Rhenish open cast mining area of Inden which was excavated by the university of Bonn since 2011 (Bremer 2014).

In a range of 200 m around the church several Roman buildings, a well, and a road dating into the same period were found (Fig. 2). Furthermore large quantities of *matres* and *matronae* stones were reused as building material in the settlement. These finds are indications for a small vicus with a temple located in the future village. Remarkably some walls of the Roman buildings stood exactly on modern property boundaries which is a direct indication for continuity.

A Late Roman or Early Merovingian cemetery with inhumation graves of the 5th/6th century were found 50 m west of the church in Pier. Burials of the 6th/7th century were excavated on several places in the contemporary village; including a large main cemetery 150 m west of the church, a separated burial ground with more precious grave goods in the area of the church and several small groups or solitary graves which were arranged in a semicircle around the centre of Pier (Reichert 2012). Among the solitary burials was a women’s grave of the 6th century with outstanding wealthy grave goods. The grave was located next to the mentioned early burial ground of the 5th/6th century.

In contrast to the grave-finds, settlement structures from the Early Middle Ages are rare in Pier, but that does not surprise considering the intensive erosion and massive disturbances in the contemporary village.

Fig.1. Circles and dots: Modern village churches in the Northern Rhineland tracing back to predecessors of the 7th/8th century. Dots: Early churches build on cemeteries from the 5th/6th century. Question marks: unclear cases. 9: The village of Pier mentioned in the text.
However it is likely, that the area of the modern centre was occupied by at least a few farmyards because the small grave goods are very similar to so called “Hofgrablegen” in South-western Germany (e.g. Stork 2004). In addition, there are indications that the manor house of a demesne was situated in the area of the church, because, besides the wealthy burial, a tombstone of a women called “domina cheldofrida”, dating into Merovingian Time, was integrated secondarily into the church (Böhner 1958b: 464f.). Furthermore a wooden preceding building of the modern church dating into the 7th century was found. Due to written sources, it was a proprietary church – another indication for a nearby manor house (Reichert 2012: 31–40; generally Kropp and Meier 2010: 103).

Such as for the Merovingian period, not many Carolingian relicts of dwelling have survived in the middle of Pier. Even though, a well and a few pits show that the area was also inhabited in that time.

In contrast to the preceding epoches, a dense dwelling structure was documented for the High Middle Ages. In addition, new small properties were founded on the outskirts of the settlement. A concentration of wells in the centre could be an indication that these quarters were inhabited by the rural peasant elites already in that time. For the Early Modern Times it is obvious that the area was occupied by the local elites, as large yards on historical cadastral maps of the 19th century show.
Besides the areas around the church in Pier, there were several other dwelling sites which were not continuously occupied in Late Antique and Medieval Times, including at least three Roman villas, two High Medieval abandoned sites. The latter ones were founded in the High Middle Ages (Fig. 3). Because of the parallel existence of discontinues and continual settlements in the area of Pier, this place provides ideal conditions to invent models of settlement dynamics in the rural Rhineland.

3. CONTINUITY AS A STRATEGY OF POWER?

The above described evidences for settlement continuity are surprising, mentioning the immense changes in the long considered time period. Doubtlessly, there was a break between market orientated Roman agriculture and the predominant subsistence economy of the Early Middle Ages (Abel, 1964). Furthermore the formation of manors with its large demesnes in the Carolingian time must had an enormous effect on the settlement structures; likewise the again market orientated agriculture which arose with the formation of several towns in the High Middle Ages (Irsigler 1983; Rösener 2004).

Moreover, the local ruling systems in the rural underlied diverse fundamental changes. The domination of the Roman aristocracy, based on villae rusticae, was totally different from the likely small warrior-groups controlling the land in Merovingian Times (Wickham 2005: 442–518; Dick 2014). There is an ongoing debate whether the local leaders of the Merovingian Time were replaced by new rulers who were integrated into the manorial system (Steuer 2011; Theuws 1999). Another significant transition of the ruling system was the formation of the lower gentry and the development of smaller dominions instead of large earldoms till the second half of the 11th century (Freedman 2012; Groten 2002). Also the formation of rural communities in the High Middle Ages doubtlessly changed the rural live immensely (e.g. Bader 1953; Spieß 1995).

Also the changes of agricultural techniques or the strong population changes must have been of importance (Abel 1964; Irsigler 1983). This list of potential influences on the rural settlement structures could be almost endlessly continued.

As mentioned above, settlement continuity has been predominantly explained with natural or economic location factors. But the natural conditions in the flat lowlands of the so called "Kölner Bucht" of
the Northern Rhineland are relatively even, thus a lot of potential locations for a settlement are possible in one area. Furthermore, only exceedingly few sites are located at the crossings of Roman main roads (e.g. Sieper 1964). Hence infrastructure was not a reason for long-term settlement continuity. The reusage of Roman ruins to recycle raw material is also no general explanation for settlement continuity, because the remains of metal and glass at the sites were certainly endless and the most of these building relicts would have been disappeared at latest in the High Middle Ages with the more intense construction of stone churches and castles (cf. Hooper 2001: 33). Therefore supplementary models are required to understand long term settlement continuity.

In the mentioned example of the village Pier, two things were concentrated constantly in the village centre: Firstly ritual sites in a broader sense, like the possibly matres and matronae temple, the proprietary church or the latter parish church, also burials are related with religious ceremonials. Secondly the rural elites were concentrated in the village centre of Pier – the living and often also the death. This is in particular clear for the Merovingian Times, when the excavations with the most valuable grave goods were situated by or nearby the church. Another evidence for the local elites could be the probable manor house in the centre or the indications for the rural elites who occupied the centre potentially already in the High Middle Ages.

Assumably the centre of Pier was a symbol of power in all regarded periods (Fig. 4). The religious component was an additional instrument to legitimate the ruler’s position ideologically. It was likely performed with burial ceremonials, feastings, rituals or the representative residence next to the place (Brather 2009; Härke 2001). Especially new rulers had to justify their positions and needed a convincing ideological legitimation strategy. Thereby the spatial and performative reference to old cultures and symbolic places of the previous rulers could have been of great importance. This could be an explanation for constant settlement structures in times of social and cultural transformations. A process that have to be examined in detail.

After the dissolution of the Roman villa-system the local elites of the Merovingian Times in Pier buried their ancestors likely in the ruins of the ancient vicus, presumably in the area of the past matres and matronae temple, as the masses of reused stone monuments in the grave chambers show. Probably the place was continuously used from Roman to Merovingian Times and the ancient meaning of the place was still known. It is thinkable that the new Merovingian elites consciously referred back to the site and reinterpreted it as the place of their ancestors. It is impossible to say, whether the pagan site became a Christian meaning already in this time (cf. Brather 2009: 100f.).

In the late Merovingian Time a proprietary church was build into the old burial ground. Thus the meaning of the place changed again. The builders of the church became part of the emerging ecclesiastical organisation in rural space, which is a sign that they were part of supra-regional network. Simultaneously a link between the own ancestors and the ideological order of the world was created, which is likely part of a legitimation strategy. This is an argument for the above mentioned theory that the Merovingian warrior-elites lost their power gradually when the villa system emerged in the 7th century.

At first sight, the fact that the lower nobility began to build castles outside the settlements since the 12th/13th century contrasts with the theory that the centres were of enormous importance for the legitimation of power. As mentioned, the higher nobility began with the practice and the lower nobility followed later. Therefore the castles of the rural lower gentry showed the will to be part of the nobility. It is a symbol which was directed to groups in the same position or higher and should have shown consciously that one stood above the peasant society.

In the following centuries castles became a substantial part of the noblemen self-image (Groten 2002; Maurer 1976). The noble families named themselves after castles in their possession, which was a reference to traditions and ancestors (Bremer 2016). Therefore the symbolism of noblemen’s power moved geographically from the centres of the settlements to the castles. Thereby the noblemen created a new myth of origin and thus the castles outlasted till Modern Times.
The averting of the noblemen from the old settlement centres gave the peasant elites the opportunity to occupy the symbolic places around the churches. This group took over key positions in the emerging village communities of the High Middle Ages. Hence they acquired power for themselves which needed legitimacy (e.g. Spieß 1995). The peasant elites often took over the former manor houses or build new large farmyards in the centres, which promoted the formation of nucleated villages (Mersiowsky 2001: 260–266; cf. Schreg 2006: 287f.).

**3. CONCLUSIONS**

The spatial turn and the discussion about the symbolic and performative meaning of landscape can offer supplement explanations for the often regarded phenomenon of long-term settlement continuity in rural space. Because the occupation of places with religious functions was obviously a frequently applied strategy to ideologically legitimate power. The rural elites referred to the sacral symbolism of the sites and simultaneously created new meanings. These places are often relicts of former cultures, like ruins. Likely these places had a special meaning in the collective remembrance and were used to construct traditions and descent myths.
The legitimacy of power has to be demonstrated particularly in times of crisis, when the positions of established rulers are questioned. Likewise new rulers have to stabilize their new status and needed to explain their role ideologically. In such situations the occupation of places of power and tradition in the rural landscape was in particular intensive. This could explain, why the location of rural settlements was often steady, although the society or the living conditions changed fundamentally.

As a methodical conclusion, long term processes and regularly appearing patterns in well researched areas have to be regarded for an effective research of the symbolic meaning of landscape. Furthermore a broad basis of different sources is necessary to understand the context of settlement behaviour.

PICTURE CREDITS
Fig. 1–4: by the author. – Fig. 1 relief: United States Geological Survey, SRTM 2. – Fig. 1 points: Ahrens 2001; Ristow 2007. – Fig. 3 data-basis: Geobasis NRW.

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HOW MINING CHANGES MOUNTAIN. MEDIEVAL AND EARLY MODERN LANDSCAPES IN THE HARZ MOUNTAIN’S FORESTS

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ABSTRACT
The Harz Mountains in Germany are one of the most metal rich mountain ranges in Europe. Extensive ore mining in medieval and early modern times lead to the formation of an early industrial landscape. About 65 % of the eastern Harz Mountains are now covered by forests. In these large forests thousands of unknown archaeological structures lie hidden under woodland canopies. LiDAR (Light Detection and Ranging), however, offers the possibility to generate a DTM (Digital Terrain Model) which can be used to document archaeological and historical sites in a highly precise and effective way. The sites include for example castles and strongholds, defensive dikes and ramparts, water reservoirs, deserted villages, ridge and furrow, burial mounds, mining pits and overburden tips, charcoal kilns, as well as hollow ways. These archaeological monuments form a complex, interlinked historical cultural landscape. Particularly, the emerging network of medieval settlement and economic structures (especially mining) seems to open a very promising field of research.

Keywords
Landscape archaeology, Harz Mountains, mining archaeology, Light Detection and Ranging, laser scanning, Digital Terrain Model

1. INTRODUCTION

A cultural landscape is the opposite of the original natural landscape which in Central Europe has disappeared completely due to anthropogenic influences (Bork et al., 1998: 318). Different methods to study cultural landscapes can be used, depending on the landscape’s character and the aim of the respective study. This paper will focus on analysing and interpreting historic cultural landscapes on the basis of various upstanding archaeological monuments in order to reconstruct past life ways and economic circumstances. The area of research is the eastern Harz Mountains in the German state of Saxony-Anhalt (Fig. 1).

At present time about 65 % of the eastern Harz are densely wooded and it is in these large forests that thousands of archaeological structures – many of them unknown until now – are hidden under woodland canopies. Because of their enormous number a field-based documentation is impossible. Due to the forest vegetation, for instance aerial archaeology or geophysical prospection has only very limited significance. However, LiDAR (Light Detection and Ranging) can be used as a tool to document archaeological and historical sites in a highly precise and effective way. Recording, analysing, and interpreting this hidden cultural landscape will help to develop a protection programme for these monuments in a final step.

Mining archaeology profits the most from this new method because of the enormous number of sites, including kilns, mining pits and shafts, quarries, sunken lanes, as well as deserted villages and ore smelting sites.
2. LANDSCAPE ARCHAEOLOGY AND LIDAR

Usually, archaeological research is connected with excavations and/or the analysis of artefacts. However, in the case of landscape archaeology this cannot always be realised due to the vast scale of the geographical areas that are to be investigated. One cannot excavate whole landscapes. In such cases, specific methods of remote sensing can be used to identify and systematically collect archaeological structures in a non-destructive way (Boos et al., 2008: 1).

A relatively new method of detecting upstanding archaeological monuments – especially in woodland – is the LiDAR or ALS (Airborne Laser Scanning) technology. This remote sensing method is based on the emission of pulsed laser beams from an airplane or helicopter. They are reflected by all kinds of surface such as earth, vegetation, buildings, etc. The gained data (point cloud) can be used to generate two different kinds of Digital Elevation Models (DEM). In the case of a DSM (Digital Surface Model) – which is obtained from the first echo values – vegetation and buildings are included. Therefore, the DSM is particularly relevant for forestry and ecological research, as well as urban and infrastructure planning. In contrast, a DTM (Digital Terrain Model) – which is based on the last echo values – allows a view beneath the tree canopy. Distracting factors such as dense vegetation and buildings are eliminated by using algorithms. The resulting model records the bare ground surface. Different visualisation techniques, for instance the shaded relief, can subsequently be used to display and highlight topographic features (Bofinger, Kurz and Schmidt 2007: 153–155).

The complete LiDAR data of the eastern Harz Mountains has been made available at the State Office for Heritage Management and Archaeology Saxony-Anhalt (LDA) since 2010. The data was provided by...
3. MINING HISTORY OF THE HARZ MOUNTAINS

The Harz Mountains are part of the Central German mountain range (“Mittelgebirge”). They reach their highest elevation at the “Brocken” with a height of 1,141 m above sea level. In the Tertiary this range was elevated as a fault block range along a tectonic fault lying on its northern edge (Mohr 1978). This mountain range is subdivided along a northwest to southeast trajectory into the upper, middle, and lower Harz based on morphological and geological criteria (Alper 2008b: 467).

The Harz Mountains have been reshaped by centuries of mining activities. Its wealthy ore deposits (mainly iron, copper, silver, and lead) attracted mineral exploitation and attendant settlement at least since the Early Middle Ages while its foothills were probably mined and settled much earlier. A few years ago archaeological excavations prior to the enlargement of a limestone quarry near Elbingerode, Harz county, brought to light remains of an early medieval smelting furnace with a (clay) tuyère fragment. Radiocarbon analyses on charcoal from the furnace’s dump date it to Carolingian times (8th–9th centuries AD). Thus, it is one of the oldest iron smelting sites in the middle Harz Mountains (Alper 2008a). Further finds from the northern margins and foreland of the Harz Mountains (e.g. from excavations in preparation for the construction of the motorway B6n) show that iron ore of the so-called “Elbingeröder Complex” had been smelted extensively in smelting furnaces as early as the Roman Iron Age (Behrens 1992: 148–150; Schürger 2005: 159 f.).

Large parts of the Harz belonged to the royal domain of the ruling Ottonian dynasty in the 10th and the beginning 11th century AD (Brachmann 1992; Gringmuth-Dallmer 1992; Alper 2008a). Its mineral deposits were the crucial economic basis for their sovereignty (Alper 2008b: 470 f.). Around 1350 AD (ore) mining ended almost entirely. Among others the reasons were repeated plague epidemics. In the 16th century AD it began to recover and production reached its high point in the first half of the 18th century AD (Wiegand 2002: 43–45).

Mining was and is the definitive factor for the development of environment, culture, economy, and landscape in the Harz Mountains. Fundamental anthropogenic interventions in its landscape structure – by settlement and agricultural activities with attendant clearing of woods, water management, forest cultivation, development of infrastructure, mines, smelting places, and smelting works – were the direct and indirect consequences of mining activities (Bartels 1996: 114).

In the following chapters preliminary results of research using LiDAR in the eastern Harz Mountains are presented. In this region various archaeological structures can be identified on the DTM which may be related to mining and accompanying activities. These structures are remains of closely interlinked fields of work and production processes which are part of the mineral exploitation complex and will be discussed as follows.

4. PROSPECTING AND MINING

The most important factor affecting settlement structure was the location of the mineral deposits. They were located by prospectors on the basis of vegetation (indicator plants), spring horizons, and geomorphology (Klappauf 2000: 19). Remains of prospecting for mineral resources (mainly ores) include for instance trial trenches and pits. In the Harz Mountains outcropping ore lodes were an excellent precondition for mining and were used in very effective ways in the past (Fig. 2; Mischker 2006: 367). The exploitation of (ore) deposits was first done by means of small opencast mines but soon afterwards also by shafts and
subsurface mining. Due to the nature of the deposits and according to the applicable mining law (which caused very small scale claims) a huge and almost unimaginable number of disturbances left their traces in the ground (Weisgerber 1996: 130 f.). These intensive mining activities can be traced in the landscape mainly by the presence of mining pits (“Pingen”), overburden tips, and quarries (Fig. 3). Relics of this flourishing mining landscape also include water reservoirs, dams, and ditches – for example as part of the “Oberharzer Wasserregal” (Upper Harz Water Regale) which has recently been declared a UNESCO World Heritage Site.

Ore smelting sites (especially for iron) were mainly located in the Harz Mountain’s foothills until the 8th/9th century AD. Afterwards, since the end of the 9th century AD the smelting industry step by step shifted towards the ores into the mountains with its still existing intact mixed forests. Presumably, this happened as a consequence of deforestation due to expanding agriculture in the foothills (Udolph and Klappauf 1999: 25 f.). The distribution of the remains of mining activities shows an optimal exploitation of the ore loads because ancillary structures including routes of transportation, water canals, charcoal kilns, etc. are usually located on the peripheries of the extraction areas (Mischker 2006: 367). Therefore, the DTM – together with the disciplines of (economic) geology and petrology (e.g. Franzke and Schwab 2011) – offers the potential not only to reconstruct the historic mining landscape but also to produce possible evidence for prehistoric mining activities.

5. SMELTING AND ENERGY

Once it was mined and transported to the surface, the ore was processed, i.e. crushed and separated from most of the gangue (e.g. Agricola 1556). After further treatment it could be smelted. In order to smelt ore in furnaces huge quantities of wood in the form of charcoal was required. This exclusive source of energy was prepared by charcoal burners in kilns. This took place in charcoal burning pits or
Fig. 3. Aerial photo of a field of mining pits northwest of Pölsfeld, Mansfeld-Südharz county. Photographed on July 4th 2005 by R. Schwarz (LB-no. 5508, slide no. 2748-12). The visible crop marks on the ploughed field are supplemented by remaining pits and tips in the adjacent forest.

Fig. 4. Aerial photo of the remains of charcoal kilns between Königerode and Harzgerode, both Harz county. Photographed on March 27th 1996 by R. Schwarz (LB-no. 1551, slide no. 2144-08).
platforms (Fig. 4). The latter which seem to be a younger development were constructed around a central fire shaft (so-called “Quandel”). Logs were placed around this shaft in single levels. Then, the domed construction was sealed with a layer of so-called “Stübbe” (sods and old charcoal). Finally, the kiln was set on fire in a controlled manner (Lipsdorf 2001: 217).

On the surface charcoal kilns remained as pits or circular banks (Fig. 5). These embankments are mostly situated on flat terrain and do not consist of soil but of “Stübbe”. The thickness of these rings depends on the duration and frequency of repeated charcoal burning at the specific site (Kortzfleisch 2008). Very large charcoal burning platforms – with an outer ring measuring up to 26 m in diameter – seem to be characteristic for the Harz Mountains. Most probably, these large examples date to the 18th–19th century AD as a period of an expanding demand for charcoal. This trend is supported by investigations of sites in other regions where smaller kilns – mostly below 10 m in diameter – were radiocarbon dated to the time before 1700 AD. The smaller size of kilns, their higher degree of erosion, and a bleaching of the wood-tar-layer due to a gradual degradation into humus all argue for a higher age. In order to prove this case, absolute dating of the kilns by dendrochronological and radiocarbon analyses of the charcoal remains may be a worthwhile option. Furthermore, analysis of these remains would allow to determine the species of trees being used by the historic charcoal burners and to reconstruct the former environment (Heuser-Hildebrandt 2002: 308–310; 317).

Initially, in the Harz Mountains charcoal would have been an unlimited resource but as early as the 7th/8th century AD there are the first indications for deforestation resulting from charcoal production (Klappauf 2000: 20).

Fig. 5. Cluster of charcoal burning platforms southwest of Altenbrak, Harz county, in the field parcel „Brandkopf“ (“burnt head”; azimuth 315°, height 30°). The profile graph (northwest to southeast) shows that the kiln was built on a slight slope and that it remained as a 0.5 m high embankment. © GeoBasis-DE / LVermGeo LSA, 2016, 6001573/16.
6. TRANSPORT AND SETTLEMENT

Mining in the Harz presupposed its infrastructural development. In order to transport wood up to the mines, as well as charcoal and ore to the smelting works pack animals and carts were used. Thus, transport routes were needed along which they could be moved securely to their destination places (Klappauf 2000: 19). Long time and intensive use of these roadways led them to erode deeper into the ground, for which reason they can be seen as hollow ways today (e.g. Denecke 2007). In the Central European mountain belt “conventional methods” employed so far have only led to a partial recognition of traces of (pre-)historic roads and lanes. However, the DTM permits an insight into the complex system of hollow ways across the whole mountain range. Mainly in rough terrain on inclining routes bundles of sunken lanes have emerged (Fig. 6).

Mining in the Harz led to an economical exploitation of the landscape and in its course to the formation of settlements. According to our knowledge today only smaller villages in the Harz Mountains seem to be directly related to the mining and processing of metal ores. Mining settlements were highly dependent on the productivity of the mines, as well as on economic cycles, and wars that often caused an interruption in mining and settlement activities. During the Late Middle Ages in some parts of the Harz Mountains up to 70% of the villages were abandoned (Küntzel 2005: 44–49). Sometimes, these settlements were defended and reached diameters of up to 770 m. In many cases they can be identified on the DTM.

Their inhabitants tried to subsist with the help of farming which was productive only to a limited extent due to unfavourable soil and climatic conditions. Agricultural remains comprise ridge and furrow,

![Shaded relief model of an up to 300 m wide fan of hollow ways south-southwest of Gernrode, Harz county, on the “Kleiner Kupferberg” (“little copper mountain”; azimuth 315°, height 30°). The profile graph (northwest to southeast) shows many parallel tracks. © GeoBasis-DE / LVermGeo LSA, 2016, 6001573/16.](https://example.com/image.png)
field boundaries, and lynchets. Increasing settlement and economic activities were also accompanied by the establishment of dominions. Mineral and wood resources, as well as wealthy hunting grounds were favourable economic factors. Archaeological remains related to territorial sovereignty include the many castles, strongholds, and royal manors ("Pfalzen"; Schwarz 2014) which can be found in the whole Harz region.

7. CONCLUSIONS

The archaeological monuments which are preserved in the Harz Mountains form a complex cultural landscape. This network of different elements can be recorded in a holistic way and in great detail by using LiDAR. In addition to the morphological evaluation of the DTM – which has only just begun – the results will be combined with information gained by the analysis of satellite imagery, aerial photographs, geophysical, and archaeological surveys, excavations, as well as written and cartographic sources in the forthcoming stages of the project (Fig. 7). Eventually, it will be possible to interpret these complex structures and draw conclusions about the various historical and economical (above all mining) processes.

Fig.7. Scheme of the sources used to record the archaeological monuments in the cultural landscape of the Harz. DTM © GeoBasis-DE / LVermGeo LSA, 2016, 6001573/16. Topographic map and orthophoto © GeoBasis-DE / LVermGeo LSA, 2013, 010213. "Preußisches Urmesstischblatt" (oldest ordnance survey maps in Prussia) by courtesy of the Berlin State Library – Prussian Cultural Heritage.
The different aspects are the basis for the reconstruction of an early industrial landscape in the interdependency of human being, technique, and environment (Klappauf 2000: 27). The final aim is to achieve a laminar recording and analysis for the first time. Unfortunately, however, the increasing use of huge harvesters in forestry management is causing intensive damage to and loss of archaeological sites. Recording the Harz Mountain’s heritage will hopefully prove to be a significant prerequisite for its protection.

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LANDSCAPES OF REMEMBERING, LANDSCAPES OF FORGETTING. THE LANDSCAPE AND MEMORY IN EUROPEAN CULTURE

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ABSTRACT
The main objective of the paper is to outline some of the ways in which the Europeans have perceived landscapes since a major shift to the visual perception occurred in the culture of Europe in the late XVIII century, as well as some of the most important consequences from these transformations for the present situation.

In order to reach the objective set, a number of methods are applied. Apart from the comparative analysis of selected previous research on the subject, it was decided to focus on the novel ‘Austerlitz’ (2001) by W.G. Sebald in relation to which the method used can be found partly similar to that of literary criticism: a ‘landscape hermeneutics’ of the text is offered, upon completing which it is concluded that the novel can be understood as a practical strategy for one’s perception of landscapes, both cultural and natural, in the present historical and cultural situation, in such a way itself being a dialogue with European tradition of seeing the landscape. The kind of landscape history that is offered in the novel is crucial to any effort to study the history of space as it has been apprehended and treated within Western culture.

Keywords
city, landscape, seeing, history, memory, subjectivity


In his text ‘Of other spaces’ Michel Foucault observed that ‘space itself has a history in Western experience’ (Foucault 1984). Since the landscape has always been an important part of that specific Western feeling of space, it can be presumed that its history constitutes a significant domain within any ‘history of space’ project. In order to trace out this ‘landscape history’ in its most rough outlines, which is a prerequisite for any attempt to understand the way landscape is perceived today, we must go back to the end of the 15th century, for the history of space in the West certainly includes that specific mode of functioning of different places that can be called properly Medieval, when ‘there was a hierarchic ensemble of places: sacred places and profane places: protected places and open, exposed places: urban places and rural places <…>’ It was this complete hierarchy, this opposition, this intersection of places that constituted what could very roughly be called medieval space’ (Foucault 1984). This hierarchized Medieval space was then opened up in the 16th-17th centuries XVI – XVII centuries , which came as a consequence of the discoveries made by Giordano Bruno (Schmitt 2008: 611) and Galileo (Foucault 1984), who made it possible to think space in terms of its ‘infinite openness’ (Foucault), or, to put it differently, its ‘emptiness’ (Carl Schmitt): ‘a thing’s place was no longer anything but a point in its movement, just as the stability of a thing was only its movement indefinitely slowed down’ (Foucault 1984). Since every place had lost its uniqueness and became just one of many, which, according to Carl Schmitt, went current during the 17th century XVII century (Schmitt 2008: 610-615), a need in modelling this new space according to a
certain pattern and thus establishing a new hierarchy arose. Soon, all the qualities of the city as such were
diffused over the territory of a state, neglecting all the differences between these spatial formations, so
that from the beginning of the XVIII century onward the territory of a state was patterned
after the city’s territory: ‘the model of the city became the matrix for the regulations that apply to a whole
state’ (Foucault 2001: 351). From this point on and until the time of Napoleon issues of urban planning
and architecture are being credited by politicians as the disciplines that are directly linked with process of
governing the state. And since urban policies are considered to be of the utmost importance not only to
the city but to the territory of a whole state, the city, this outstanding achievement of European civilization,
undergoes drastic transformation: it is not any longer perceived as a separated place, a kind of exclusion
from the surrounding landscape (Foucault 2001: 351).

This brief overview of the history of space can be continued by suggesting that since then the concurrent
process also started, that of transportation of images of landscapes into cities, the transportation that was
carried out by such media as, most notably, panorama, diorama, photography and, last but not least, film.
With the development of various visual media a landscape was detached from the actual space it had
occupied and then connected with the realm of entertainment for the visual consumption in the form of
an image – the process that resulted in flooding of European cities with imagery of different landscapes
and far-away lands. Chateaubriand, a crucial figure to understand European romanticism and its longings,
as well as the zeitgeist of the early 19th century XIX century, noted that the recreation of Athens and
Jerusalem, which he had visited during his journey, in one of the dioramas of Paris, where they had
been shown some time later, struck him with its actual and complete similarity to the original landscapes
remembered by him: ‘I could not expect that Jerusalem and Athens will be taken to Paris to prove I am right
or wrong [in my writings about these places]’ (Iampolski 2012: 104-105).

1.1. The landscape and literature: points of intersection

Being intricate as it is, this shift in attitude towards the landscape within European culture is embedded
into the novel ‘Austerlitz’ (2001) by W.G. Sebald. It is my suggestion that this text is an important input
into our understanding of all the various ways in which the landscape has been perceived during the last
two centuries of European history. To prove this, a ‘landscape interpretation’ of the novel is undertaken,
being a crucial part of this research effort as a whole. From this vantage it would be useful to make several
remarks on that kind of methodology that will be employed below. Using a kind of reverse perspective,
the novel’s text is read as a landscape, which is most importantly connected with the novel’s protagonist’s
reading of landscapes as texts of personal and collective memory and history. The text, correspondingly,
is treated as a landscape – rather the imagined or the remembered one, than the real one – stretching
before the reader’s eyes and occupying both the space of language and literature and real landscapes,
representing the latter with the help of language mechanisms of sense communication. Instead of reading
the novel as a story, an attempt is made to read it as a set of practices of encountering various landscapes
and remembering their past, historic forms by means of questioning their space, which has served as a
scene for both natural and human histories in their intertwinement. This can be done only by noticing the
tiniest fragments and remains of landscapes’ previous states and constantly applying this knowledge to
own subjectivity.

2. FROM KANT AND CHATEAUBRIAND TO AUSTERLITZ: WAYS OF SEEING THE LANDSCAPE IN EUROPE

Our ability to conceive landscape has always been connected with our memory. That zusammenhang,
internal cohesion, which, according to Carl Ritter, was one of the key characteristics that made any
landscape possible (Martin et al., 1993: 128), was rooted precisely in European cultural memory as ability to interpret various elements of environment exactly as parts belonging to a single whole, to piece together all the separate and seemingly independent fragments, thus providing our sight with unity and integrity – the qualities which are themselves essential for the very possibility of classifying something as a landscape by placing our perceptions under the common term. This cultural memory, however, has always stayed itself dependent on various social and economic processes, rather than a constant beyond time and history. Its transformations therefore have been influencing the way Europeans grasp landscapes ever since the major shift to the visual occurred as witnessed by Kant in his ‘Critique of Pure Reason’ (1781). Heralded by him, transcendental imagination, *Einbildungskraft*, was a new stage in Western perception of the world, an ability to organize it into the form of an image, *Bild*, or, in other words, a phenomenon: transcendental imagination replaced reflection, images replaced ideas, the latter now being mostly preoccupied with the deciphering of the visual landscape grasped phenomenally by the subject, who himself was from that point on ‘to a lesser extent understood’ as a ‘thinking man’, being instead more and more often understood as an ‘observing man’ (Iampolski 2012: 7).

It is since then that Modernity, understood as a cluster of changing regimes of human subjectivity, became more and more entangled with all the various transformations of optical regimes, ways of seeing, that have been influencing Western subjectivity and rationality ever since. The becoming Modern Age cannot be properly described without considering that fundamental interaction that has always been happening between our body-image of ourselves and our perception of the environment, enveloping us both nearby and at the distance. Only by means of distancing ourselves from this latter random external forms are shaped into a coherent whole that is afterwards visually and intellectually perceived as an image and correspondingly every image retains something from the image of a landscape, because to see the image we need distance. This new image introduced by Kant was therefore the image of a landscape as seen from a certain distance, and the landscape became, upon its crystallization into a theory and then a science after the revolution made by Kant, that *Bild* from *Einbildungskraft*, being initially grasped and comprehended in terms of visual code: ‘we must keep from going very near the Pyramids just as much as we keep from going too far from them, in order to get the full emotional effect from their size. For if we are too far away, the parts to be apprehended (the stones lying one over the other) are only obscurely represented, and the representation of them produces no effect upon the aesthetical judgement of the subject. But if we are very near, the eye requires some time to complete the apprehension of the tiers from the bottom up to the apex; and then the first tiers are always partly forgotten before the Imagination has taken in the last, and so the comprehension of them is never complete’ (Kant 1914: 112).

Among all visual media panoramas and dioramas can be understood as some of those that were, apart from being a means of entertainment, a symbolic vehicle, both representing this new seeing and training population through an ‘optical education’ how to get accustomed to a rapidly modernizing urban environment: ‘Announcing an upheaval in the relation of art to technology, panoramas are at the same time an expression of a new attitude toward life. The city dweller, whose political supremacy over the provinces is attested many times in the course of the [19th XIX] century, attempts to bring the countryside into town. In the panoramas, the city opens out, becoming landscape’ (Benjamin et al. 2008: 108). Robert Barker’s ‘Panorama’, first exhibited in London in 1792, employed a technique never before seen in the history of Europe on a mass scale, when a spectator was unable to grasp an image at a single sight, being forced to turn around his or her own axis and contemplate the painting from a certain distance, from the center of a rotunda, consuming the visual space of a panoramic image in a symbolic 360° journey around the world. Being a state-of-the-art attempt to create a totally enveloping image, the panorama also leads to an inevitable consequence of fragmentation of its visual field into smaller fragments, ruins of once coherent image, and to be able to discern them the spectator must be able to change his or her distance to the image, coming closer (zooming in) to see everything in detail and then going backward (zooming out) to see the general view, scenery as a whole.
The media of photography and film were parts of that grand process of the transformation of Western seeing that started with Kant's theses in philosophy and panoramas in European cities: 'One sought tirelessly, through technical devices, to make panoramas the scenes of a perfect imitation of nature. An attempt was made to reproduce the changing daylight in the landscape, the rising of the moon, the rush of waterfalls. David counsels his pupils to draw from nature as it is shown in panoramas. In their attempt to produce deceptively lifelike changes in represented nature, the panoramas prepare the way not only for photography but for [silent] film and sound film' (Benjamin et al. 2008: 99). What is happening in the process of accommodation of the old European seeing to these new patterns is precisely the disintegration of the field of vision of the European subject of the 19th century XIX century. In panoramas, for instance, the most important is neither detail nor the general view, but precisely a need to combine them both in order to be able to see the panoramic image. It is because this image is seemingly coherent and vivid as it has never been before that it starts to fall apart, with this falling apart being at the same time cause and consequence of the collapse of the old regimes of European seeing that predated Modernity. One is not able to see the whole any longer, being forced to oscillate between seeing fragments and seeing the panoramic view – exactly that will be employed later on in cinematic editing with its change of shots from close-ups to medium shots and long shots. The roots of this transformation can be found in quotidian life of a European urban-dweller that is being gradually filled with a stream of publicity images, new transportation vehicles, visual noise and dim gaslight of overcrowded streets.

To understand how stubbornly the previous type of memory was resisting these changes in perception one can turn to the writings of Chateaubriand once again. While on his travels, Chateaubriand was obsessed with ruins and visions of remains of old cultural landscapes (his famous visit to the ruins of Sparta being one of the most well-known examples). The most interesting observation is, however, that he systematically applies cultural code to decipher natural phenomena. Upon visiting Vesuvius, for example, he noted: 'I despair of describing the chaos which surrounds me. Picture a basin, a thousand feet in circumference and three hundred feet deep, which slopes downwards in the shape of a funnel. Its margin, or interior wall, is furrowed by the liquid fire which this basin has contained and expelled. The projecting parts of the walls resemble those brick pillars with which the Romans supported their piles of masonry'. (Chateaubriand 2010: 93-94). After the initial statement about the impossibility of any description, what follows, nonetheless, is an attempt to comprehend scenery in terms of cultural memory, when fragments of environment are seen through the pattern of Roman architecture (Iampolskii 2012: 108). This attempt, inspired by Kant's transcendental imagination, fails to take into account this new doubled perspective, a vantage point from which two processes of seeing should complement each other while switching between the vision of the disintegrating whole and its fragments.

In contrast to the attitude of Chateaubriand, the main protagonist of the novel ‘Austerlitz’ by W.G. Sebald, Jacques Austerlitz, who can indeed be called a ‘19th XIX century man’ appears to be haunted by visions of landscapes that had occupied every square inch of ground before cities and towns were erected there by humans, being at the same time obsessed with attention with which he treats the smallest detail of cultural artifacts he encounters – predominantly, but not solely, architectural forms, for he is an art historian with a particular interest in the history of fortifications. This way of seeing is for Austerlitz a direct consequence of his own, personal history, but in this latter he appears to be embedded both into the great transformation of Western perception of space that has been taking place during the last centuries and of which Austerlitz himself is yet another coil, and therefore into the natural history of the landscape in its intertwine with the human history. For him, and to a certain degree for the novel’s narrator, who befriended Austerlitz in the late 1960s in Antwerp, every landscape is not a landscape in a sense of a ready image, but a difficulty, an obstacle for vision that has yet to be absorbed by the beholder, with this contemplating subject, however, always undergoing a substantial transformation in the process. The cultural form supersedes every natural landscape, yet from the novel’s perspective reason is misunderstood and misused mostly as a tool for prescribing environment a certain mode of functioning:
'And whenever I think of the museum in Terezín now, said Austerlitz, I see the framed ground plan of the star-shaped fortifications, color-washed in soft tones of gray-brown for Maria Theresia, her Imperial Highness in Vienna who had commissioned it, and fitting neatly into the folds of the surrounding terrain, the model of a world made by reason and regulated in all conceivable respects' (Sebald 2011: 206) (see Fig. 1).

Any inhabited space, be it a cityscape or some distant hills and castles atop of them in the valley of the Rhine river, as seen from the passing train, for Austerlitz is still populated with those who once lived there and then passed away and were apparently forgotten, as well as natural landscapes that once covered all the territory of Europe and then were gone in the process of history: it is destruction, decay and dying that unite the human and the natural in the novel. Two lengthy quotes – among so many possible examples – can give a good idea of how the cultural and the natural are intertwined in ‘Austerlitz’ and how the former is embedded into the latter and gradually arises from it, becoming in doing so aware of its own origin. The quotes relate to the description of the history of Liverpool Street Station – both its natural and cultural outlines: ‘I knew that on the site where the station stood marshy meadows had once extended to the city walls, meadows which froze over for months on end in the cold winters of the so-called Little Ice Age, and that Londoners used to strap bone runners under their shoes, skating there as the people of Antwerp skated on the Schelde, sometimes going on until midnight in the flickering light of the bonfires burning here and there on the ice in heavy braziers. Later on, the marshes were progressively drained, elm trees were planted, market gardens, fish ponds, and white sandy paths were laid out to make a place where the citizens could walk in their leisure time, and soon pavilions and country houses were being built all the way out to Forest Park and Arden. Until the seventeenth century, Austerlitz continued, the priory of the order of St. Mary of Bethlehem stood on the site of the present main station concourse and the Great Eastern Hotel. (...) <…> The hospital for the insane and other destitute persons which has gone down in history under the name of Bedlam also belonged to the priory outside Bishopsgate. Whenever I was in the station,
said Austerlitz, I kept almost obsessively trying to imagine - through the ever-changing maze of walls - the location in that huge space of the rooms where the asylum inmates were confined, and I often wondered whether the pain and suffering accumulated on this site over the centuries had ever really ebbed away, or whether they might not still, as I sometimes thought when I felt a cold breath of air on my forehead, be sensed as we passed through them (Sebald 2011: 126). Austerlitz is trying to imagine those who passed away in the same way he attempts to recreate the landscapes of the past before his inner sight, the gaze of collective memory. We can see how nature is surpassed by history, but the two remain present for Austerlitz at the same time, both visible and their traces remaining imperishable. By listing the river and ponds, herons and elms and mulberry trees alongside with the inmates of Bedlam Austerlitz equates the two histories: ‘Around 1860 and 1870, before work on the construction of the two northeast terminals began, these poverty-stricken quarters were forcibly cleared and vast quantities of soil, together with the bones buried in them, were dug up and removed, so that the railway lines, which on the engineers’ plans looked like muscles and sinews in an anatomical atlas, could be brought to the outskirts of the City. Soon the site in front of Bishopsgate was nothing but a gray-brown morass, a no-man’s-land where not a living soul stirred. The little river Wellbrook, the ditches and ponds, the crakesand snipe and herons, the elms and mulberry trees, Paul Pindar’s deer park, the inmates of Bedlam and the starving paupers of Angel Alley, Peter Street, Sweet Apple Court, and Swan Yard had all gone, and gone now too are the millions and millions of people who passed through Broadgate and Liverpool Street stations day in, day out, for an entire century. As for me, said Austerlitz, I felt at this time as if the dead were returning from their exile and filling the twilight around me with their strangely slow but incessant to-ing and fro-ing’ (Sebald 2011: 128).

Austerlitz’s sight literally functions like a panorama or diorama, where his visions of constantly transforming landscapes stand for the whole of the panoramic image, with the foreground being those ruined parts and fragments through which and only through which a whole can be comprehended in its movement through history. It can be concluded therefore that Austerlitz is a flâneur, capable of discerning the smallest detail of the surrounding visual environment, as well as keeping the whole image in mind. One mustn’t see his figure as an effort of conservative or nostalgic thinking, for his faculty of seeing landscapes of the past is possible not as an older form of ‘holistic’ European memory like that of Chateaubriand, but rather as a form of cinematic rewind. Although in contrast with the film’s rigid flow of images, Austerlitz’s memory doesn’t dare to make everything visible: ‘everything becomes confused in my head: my experiences of that time, what I have read, memories surfacing and then sinking out of sight again, consecutive images and distressing blank spots where nothing at all is left’ (Sebald 2011: 238). It is this vagueness and obscurity of the images he sees that allows Austerlitz to remember what he has never seen, in such a way practicing his strange doctrine of redemption of history: ‘I see that German landscape, said Austerlitz, as it was described by earlier travelers, the great river not yet regulated in any way, flooding its banks in places, salmon leaping in the water, crayfish crawling over the fine sand; I see Victor Hugo’s somber pen-and-ink drawings of the Rhine castles, and Joseph Mallord Turner sitting on a folding stool not far from the murderous town of Bacharach, swiftly painting his watercolors’ (Sebald 2011: 238-239).

Hence, a project that is subtly proposed by the whole modus operandi of Austerlitz is a highly needed landscape history. What kind of history is it? The building’s exterior and interior details and its history, traced to the point of restoration of natural landscapes that had once predated it, belong to a single task, a single project offering a new way or even ethics of seeing, different from both the repressive rationality behind the Terezín’s plan and postmodern visual chaos of scattered particles of images and forms. In this project the two histories – that of nature and that of human beings – are no longer separate narratives of violence and sequences of disconnected events, but a whole. Every cultural form appears to be closely related not only to its own omnipresent latent dilapidation, but also to the history of nature as well as to ageing, death and dying of human beings, thus touching upon the fundamental issues of memory and our ability to recognize the flow of time behind the present day cultural forms, perceived metaphorically as ruins, a momentary pause in the never ending process of history. These ruins should be in turn treated
not as a collection of wreck or debris, devoid of any history, but precisely as traces of the latter, its text. A perspective introduced by the novel suggests that we need to remember natural landscapes as they had once occupied all the territory where human activity is now spread in order to comprehend the roots of the cultural state, its natural background. In this remembering – itself being possible only under condition of our attention to the tiniest detail of what we grasp – we must focus not on aesthetic qualities of landscapes, but instead on the very shift between the natural and the human, the shift that is constantly reoccurring in the cultural condition itself, as well as in every human being – a creature both biological and social. The visions that are constantly haunting Austerlitz belong less to the realm of imagination but rather are evidence of our ability to remember in a way that should recall some of the great missed opportunities of European history, bringing to mind a memory that does not impose a certain schema or grid, according to which we are forced to classify all the new we meet. If for Chateaubriand every ruin was an element of a strict code with its logic of deciphering already well known to the perceiving mind, in full accord with Kant’s understanding of reason, for Austerlitz the result of this procedure of finding correspondences between the new and the existing can be never known beforehand. His memory lets different layers of meaning and interpretation coexist without suppressing each other, turning a ruin, a fragment, a detail into a building block of things yet to come: ‘I saw a dome of openwork masonry, with a parapet around it on which grew ferns, young willows, and various other shrubs where herons had built their large, untidy nests, and I saw the birds spread their great wings and fly away through the blue air. I remember, said Austerlitz, that in the middle of this vision of imprisonment and liberation I could not stop wondering whether it was a ruin or a building in the process of construction that I had entered. Both ideas were right in a way at the time, since the new station was literally rising from the ruins of the old Liverpool Street’ (Sebald 2011: 133).

3. CONCLUSIONS: THE LANDSCAPE AS THE ETHICS OF REMEMBERING

The landscape, understood not as a set of independent characteristics and facts of space, but as a process, attempt of a human being, belonging to a certain historical age, to apprehend a landscape by her or his imagination, has its own history. During the 20th XX and the 21st XXI centuries various media have been transforming our ability to grasp the landscape in such a way that it is becoming more and more determined not even by any particular dominant medium, i.e. photography or film, as it was true for the 19th XIX century with its panoramas and dioramas, wallpapers and advertising imagery, but by a multitude of images dispersed throughout the whole of mass culture. Since the landscape is a part of culture, representing – through our awareness of various codes according to which it is described and treated – a dominant rationality of given historical age, our comprehension of it and ability to see it, to live it through, are of utmost importance for the process in which our subjectivity is being shaped. Subsuming every landscape as an image under one of already known categories we act in strict accordance with Kant’s schemata of transcendental imagination: ‘The American tourist no longer lets the landscape “be in its being” as Heidegger would have said, but takes a snapshot of it, thereby graphically transforming space into its own material image. The concrete activity of looking at a landscape - including, no doubt, the disquieting bewilderment with the activity itself, the anxiety that must arise when human beings, confronting the non-human, wonder what they are doing there and what the point or purpose of such a confrontation might be in the first place - is thus comfortably replaced by the act of taking possession of it and converting it into a form of personal property’ (Jameson 1992: 11-12).

The history of the transformation of European perception of landscape behind this reifying approach can be symbolically located between two different attitudes: those of Chateaubriand and Austerlitz respectively. As for the latter, in his reveries and visions the landscape becomes a form of memory, a practical treatment of space. Being such a remembrance, the landscape, as well as the architectural
form or, in a broad way, any cultural artifact, becomes an indicator, describing culture's awareness of its own ties with nature as well as the main source of inspiration to remember one's personal history.

Hence, we have reached the uttermost consequences of the Austerlitz's position and its importance for the present day – its ethical argument. Because if every square inch of ground under each and every building is saturated with blood and paved with bones of those who were taken by history to be used in its mortar, and if small and almost unnoticeable traces point at human conquest of nature, then our ability to see this omnipresent ruinous state of every cultural landscape is not an option about which we can decide whether we need it or not, but a duty. And at this point the ways of seeing a landscape are relocated into the domain of ethics, understood as a practice of living one's life in such a way so that not to be able to forget, for the only evil is that of memory failure, the evil of forgetting. It is the architectural form that is constantly provoking Austerlitz to forget with its illumination, wholeness, coherence and importance, always bordering on conceit, with its art to enclose space and thus reverse the change of days and nights by creating a precedent of windows lit by light and shining out into the darkness.

The following step could be a construction of a new view on the landscape, where the latter will be no longer a passive recipient and retainer of once achieved forms and qualities, but a subject, an actor and thus a driving force behind the mankind’s longing for the common good. The complex apprehension of how the sociocultural environment integrates the past and its traces into its present state can be obtained with the help of methods introduced into this new vision from landscape studies, human geography, architecture and other disciplines. This suggested interdisciplinary approach can be found already present in the novel ‘Austerlitz’, where history, archeology, architecture, philosophy and art studies are employed in accord to achieve a new seeing of what a landscape is, discovering in the process – and this is perhaps one of the greatest novel’s achievements – that there is no such thing as a landscape, but only a never ending process of interaction between human beings, embedded into their culture, and nature, enveloping them.

NOTES
[1] Oliver Grau traces the origins of virtual reality through panoramas to Roman Villa dei Misteri in Pompeii, making it clear that the pursuit of illusion was not new at all to the European visual culture as such (Grau and Custance 2003: 29, 31).
[2] ‘As far as I was concerned the world ended in the late nineteenth century. I dared go no further than that’ (Sebald 2011: 111).
[3] It should be kept in mind nevertheless that Austerlitz makes no distinction between landscapes in terms of their belonging to the natural or the human history.

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THE UNKNOWN LANDSCAPE. PUBLIC PERCEPTION OF UNFAMILIAR HERITAGE

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ABSTRACT
Our own personal spatial space extends from individual spatial requirements to the social space which builds spatial delimitation. Built space is something experienced. Its impact is not always perceived but unconsciously felt. Such unconscious perception allows to appreciate the form and its completeness, but only in its momentarily state. Without the knowledge of the past the meaning of the cultural heritage ‘closed in stones’ remains outside the perceived world. Only the surface remains, the hidden heritage remains unfamiliar.

The article concentrates on the issues of the perception of the heritage in present space which are unfamiliar for it today’s users. Mostly because of the history and its implications. The case of the city of Lodz, Poland, shows a struggle to identify the heritage in the minds of the citizens. The specific history of the industrial city robbed of its identity, first by the Second World War and then by the complete collapse of the textile industry shows the difficulties in bringing back to everyday perception the values of the past. Urban structure, architectural heritage could be seen as an impediment of the growth even as the past is completely unfamiliar and therefore unfelt.

Keywords
architectural heritage, environmental awareness, postindustrial space, urban structure, Lodz

1. LANDSCAPE AS LOCAL MEMORY OF THE IDENTITY

The landscape of a city is always something unique. Even if some places look slightly alike. Even if the processes of globalization standardize the elements of the cityscape. Facelessness or interchangeability of contemporary cityscapes, as evasive as it is, in the eyes of the inhabitants is something special because of the personal experience of space.

Our own personal spatial space extends from individual spatial requirements to the social space which builds spatial delimitation. What we experience as our personal space reaches well beyond the boundaries of our body. Personal living space extends as far as the reach of our senses and our movement capacity and which are important in our personal existence and usage of different places (Janson and Tigges 2014: 228-231, 290-296).

This is the way most of us experience the world around us. The one full of everyday actions, and the worlds visited only briefly during tourist trips. Sometimes the places we visited are for us more felt and known then the ones we use for everyday experience, the ones we live in. We do not use much time in our work or leisure at home to discover the past of the places we live in. We perceive them through everyday actions and necessities. It is our living space where not such kind of knowledge about it is most necessary – not the past heritage rules the use of space, but the present, eventually it immediate future. But subconsciously the surrounding landscape builds our identity. The lived spaces frames our actions but influence also our feelings, the ways we behave and think.
The way of making the heritage visible in the used space is sometimes very difficult undertaking. Because the past is gone in so many ways. And different people use the same space for completely different purposes. Otherwise we can also find examples of forgotten heritage because the memory of the use of the space is gone, because the former users vanished from the place (because of war or other geopolitical changes etc.). Also postindustrial cities are especially challenged through the complete change of the workable space and the tradition of the use of the buildings. The old habits are then confronted with the memory of the citizens, who still remember the long working hours, that it was their working place, not worth, or not imagined to be worth to be used differently and to be valuable as something cherished.

Also in the changing world the values are changing. We are confronted from one side with the commercial globalization and its effects. Otherwise the more and more stronger environmental awareness shows us quite different approach toward space and its use. The processes of globalization gave market value to the city and its name, but also to its soul (Sassen 2001; Bell and de-Shalit 2011). The identity of a city always existing started to mattered more because of its economical, saleable value. The identity of a city is sometimes very evasive to be put in words. And the citiescape tends to be as “brand-marked” as other aspects of our lives.

In such a world the shrinking, postindustrial cities have a harder job to maintain their landscape and redevelop its sense into a living memory. But it is not only a contemporary problem. In a 19. century novel a protagonist looks at a flourishing main street of the city, wonders how beautiful the city is and questions what could be possibly gained from it (Reymont 1987: 99).

2. SHORT-TERM CITIZENS. THE CASE OF THE CITY OF LODZ

Lewis Mumford in his monumental work ‘The City in History’ writes: ‘Beginning as a representation of the cosmos, a means of bringing heaven down to earth, the city became a symbol of the possible. Utopia was an integral part of its original constitution, and precisely because it first took form as an ideal projection, it brought into existence realities that might have remained latent for an indefinite time in more soberly governed small communities, pitched to lower expectations and unwilling to make exertions that transcended both their workaday habits and their mundane hopes’. (Mumford 1961: 31) This is a perfect description for a postindustrial city of Lodz. The city which came to exist with implementation of the textile industry and started to shrink with it collapse (Mikielewicz 2014).

2.1. The present as the memory of the past

The historical shift in the 19. century when Lodz developed from small rural town into industrial, textile centre had a major impact on the cityscape. This expressed itself especially in the center areas of the city. There was a dramatic change of urban scale. Single storey craftsman's houses were giving way not only to 3-4 storey tenement houses but also to huge factory ensembles and manufacturer's residences. All types of houses were mixed together because of the nonexistent urban regulations after 1853. This specific landscape was something natural for those who created it. At first after the II. World’s War the people did not find the dense city center and its classical, historical and Art Noveau styled buildings all too interesting. Modern Movement philosophy clashed with the grid pattern of the streets from previous century. The streets were too narrow for new law regulations and the ‘progressive’ way of thinking. The houses were thought too much ornamented and different in scale, with too big apartments for the new living standards. There was little sunlight in the narrow courtyards according to new building codes. Everything was distasteful, even more as the effect of the bourgeois culture, which the state tried to replace with plain socialist mentality. In this new ideology the new times needed also a change in urban structure. But in postwar Poland it was rare to have a city nearly spared from war destruction so the urban past of the city
was able to exist in nearly unchanged way till the change of political system in 1989. Such phenomenon was possible also because of the lack of funding, the money was always more needed elsewhere.

The total collapse of the textile industry after 1989, the industry which was the only economic reason of the existence of the city, left it with vast spaces of unoccupied factory buildings and big numbers of inhabitants who stayed unemployed, now already for three generations.

In its relatively short history as industrial center, during two centuries, Lodz developed a completely different urban structure as other Polish or European cities, more resembling the American cities with relatively big housing blocks. The city did not develop a city center, the role of the main square took the over four kilometers long Piotrkowska Street. The result gave the city a unique cityscape. A rough charm of quick money and short-lived memories.

The people who build the city were all sorts of immigrants, coming from other countries as Germany and Russia or from nearby villages. It was migration for work which make possible the explosion of the city, its surface and the population which till the 1914 rose to 600 000. But wars and economical developments were the reason of constant change of the inhabitants. Their numbers fluctuated so the city got a specific culture of multicultural, short-term citizens. With not always acknowledged social background. People interested in their personal well-being. A so called Lodzermensch wanted to gain from the city, but had no roots, no past only future. Such people do not look for heritage because their desires are placed somewhere else. But just the desires of textile entrepreneurs gave the city its most important architectural monuments, public and park areas. And after the decline of the city which came with the total collapse of its main and solitary industry the city of Lodz got left with vast spaces in the buildings and empty (or emptied through predatory developers) lots which remained from numerous factories. The processes of globalization did not leave the city unattached, but the contemporary town lacking good road and railway connections (the heritage from the partition of Poland) remains on the edge of the "better world". Confronted with declining numbers of citizens, the authorities and the local people, who started to be active as conscious citizens try to reestablish the functioning of the urban structures, and try to give the city a new perspective and a new identity.

Lodz as industrial city is one of the extreme examples of migration processes. From the first decision in 1821 the city based on immigrants. The German settler's were the qualified ones, Poles migrated from overcrowded villages and build the underpaid mass of factory workers. Jews played their traditional role in Polish society, that of trade people, but also established some of the wealthiest manufacturers. Every period of the development of the city of Lodz was strongly related with the economic, social and history related changes in the character of the inhabitants and their customs. The inhabitants numbers which increased during 19th century from few hundred to 600 000 till 1914 dropped in the 1st World War to 350 000, in 20 years rose again to 650 000 to drop again under 300 000 in 1945 and in the postwar time rose to 850 000 (Liszewski 1995: 36).

The newest development shows a dramatic incline in the population numbers. The inhabitants number dropped to approximately 790 000, with a stabile tendency for depopulation. Also the social and national structure changed. Previous a dynamic multicultural city (where Germans, Jews, Poles and Russians kept their customs but also melted with others), after the II World War changed into 'one dimension'.

The majority of Lodz population during its all history moved in the first generation from the country into the town. This gives a specific feel to the social urban behavior of its inhabitants. The city built that special atmosphere of the 'promised land' of chances for everyone with enough will to take up with the world.

Contemporary city is socially homogenous, and cops with the problems of structural unemployment caused through the collapse of the textile industry. The urban structure adapted not very well to the new car culture. Also the river valleys, the reason behind the industrialization of Lodz are not very significant in the landscape of the contemporary city. Nearly all from the over 17 streams and rivers intersecting the city from the east to the west, vanished along long stretches of riverbeds in canals under streets and town blocks. But this characteristic river layout patterned upon the street grid and the traditional river crossings
resulted in the characteristic aberration from the straight north-south orientation of the new layout of the Piotrkowska Street – the route binding the new main settlements of the industrial Lodz - New Town and Lodka. Luckily after 1945 because of the constantly not sufficient financing of the city the city core structure remained nearly intact.

The grid street pattern and the repeatability of the various building types was first acknowledged in the 1980s. The rejected past slowly started to be the most treasured heritage. Symbolic to this change was a happening organized through young architects (ensemble "Urzad Miasta") on 7th May 1981. After drastic widening of a one of many Piotrkowska (main street of the city) cross-streets the remaining single tenement house was elevated to the rank of a monument - the Monument of the House. Such elevation of this particular tenement house as symbol of the identity of the city and its character, accidentally singled out from the homogenous structure of Piotrkowska Street, marked a turning point in the way of thinking about the city and its architectural heritage and urban structure - a turning point for city's architects and urban designers. But at that time not for the authorities, and not really for the average citizen.

The city changed with the collapse of the textile industry in 1990s. A sudden need of a new identity and purpose of existence emerged. But the political change of the year 1989 brought a kind of development nobody expected. Till then the city structure and its buildings were somehow ‘frozen in time’, now the changes began to follow very quickly and brought quite a lot of damage to the cultural heritage preservation. Characteristic for this development was a repeated action in the last years undertook by a group of social city activists, who repeated the "Urzad Miasta" happening, after one of the investors demolished a tenement house in Piotrkowska Street (with an intent to rebuild it in the previous glory) and then abandoned the idea of the reconstruction, only because the management in the firm changed.

The citizens of Lodz did not valued the industrial heritage of the city. It was their workplace, and a place of very hard and strenuous work which gave not much gratification. So when the factories remained empty and their previous workers unemployed nearly anybody pitted demolition. When in the sunny afternoon on 27 May 2005 part of an old Scheibler factory collapsed during refitting works, the papers commented that such ‘useless ramshackle houses’ should vanish from the cityscape. The majority of the inhabitants shared that point of view. Such atmosphere prevailed till last years, when a change happened. (Dziennik Lodzki, Gazeta Wyborcza 2005-2016) But nearly at the same time, slowly with the refurbishment of old Izrael Kalmanowicz Poznanski factory into cultural and commercial center ‘Manufaktura’ people started to accept and cherish the old industrial heritage of the city. And they started to see it and to be even proud of it. Suddenly to cherish the places, which are not giving the possibility to earn money, staying empty and abandoned was and is a hard process. But because of quite a lot of new awareness that this space is our heritage which makes us somehow unique in the world such process evolves. After quiet a long period of time even the newspapers which only described the bad sides of the city, started to promote its industrial heritage as an immanent value.

### 2.2. Re-invented history

The symbolic meaning of heritage matters especially referring to the social behavior and the hierarchy of values. In the case of the city of Lodz the specific social history (the prevailing immigratory population, which inhabited the city for a short periods of time) and the specific of industrial monoculture pared together with the unique urban structure (grid street pattern with mixed use housing and the lack of public spaces) did not generate an emotional bond between the city and its citizens. Such bond we can observe in older cities with historical city core. The majority of the city's population started first lately to see in the cityscape the beauty and the values needing preservation. In the early 1980. acceptance for the industrial and urban heritage of the city was rare also between professionals.

The change in public awareness started slowly with the change in the press coverage and actions of local newspapers – Gazeta Wyborcza and Dziennik Lodzki which popularized different aspects of the city
history (walks, guides, descriptions of buildings). Also the authorities started to stress the role of Jewish community in the history of the city (new monuments, a new park, Survivor’s Park, coming into existence, different commemoration functions for Litzmannstadt Ghetto). The privatization of the area of the one of the largest factories and creation of the commercial and cultural center Manufaktura (around 2005) brought to new life the old glory of Izrael Kalmanowicz Poznanski factory. And the monumental industrial architecture started to impress everyone. New in Polish reality was the involvement of the public in the redevelopment process – the possibility to visit the construction site, the exhibition of remnants from the factory, a model of the site. All this actions taken by Apsys, the developer firm, we focused on the integration of the site into the hearts of the people of Lodz, and it worked. The people who had only memories of hard work and the sense of lost life because of the impoverishment and unemployment started to see a new kind of nobility in well known structures, to comment and to use it in new ways. And in other places people started to protect old remnants as the example of old Anstadt brewery in Sedzioska Street shows (here after local protest one wall with an arch remained intact). On the other side we still have enough places were the old buildings disappear sometimes during one night. But the difference in the heads took already place and the people are more vigilant about such cases.

In the 1990s, at the beginning considering the necessity of new income and identity sources for the city the authorities basically decided that when the government will build the new motorways (with the central crossing near Lodz) and it will be the natural remedy to all the evil happening in the city, because even laying in the center of the country, Lodz is very poorly communicated with the rest of the state territory. First now with the near end of the motorways development the city gained a new consciousness that the roads will not extinguish all the problems of the city or even can create new ones. With time and a few
unsuccessful attempts, the main source of the hope for the city authorities is the idea of the creativity (Florida, 2014; Strategia miasta 2020+, 2014). The idea behind is to create an image of the city as a brand of creative city and its citizens. Using the contemporary idea of ‘a creative city’ the new city strategy is taking quite a lot from the past - f. ex. the use of a new alphabet typography created through constructivist artist Władysław Strzemiński, the connotation with the film industry and the famous Lodz Film School etc. Such thinking resulted in emergence of new ‘independent’ commercial centers as OFF Piotrkowska, or Piotrkowska 217, which try to reestablish the city life in Piotrkowska Street, which vanished greatly after the new shopping centers like Manufaktura were opened (2005). This places offer the old charm of industrial buildings without the ‘gentrified’ refurbishments.

First in the 1990s the municipal authorities stated that the Piotrkowska Street is important to ‘the Promised Land’ as Lodz was called after the famous novel of the Nobel-Prize winner Reymont (published 1899). It effected in new road surface and street lamps. The authorities started also to illuminate the nicest and most important buildings in the street, and to renovate their facades. The new concept of the street initiated a real war between ‘conservative’ and ‘progressive’ thinking architects and authorities. It ended in changes in pavements patterns and types of used lamps. And in 2012 the city started a completely new refurbishment of the Piotrkowska Street, again changing all small architecture elements and paving.

But sometimes also the ideas of new redevelopment base on the ideas of the use of cultural heritage and landscape features basing on sustainable development. The systems of green areas in ‘cultural heritage ring’ and other such projects show the need of implementation of history into the better future of the city. The historic parks (Helenow Park, Park Zdrowie) and historic cemeteries (The Old Cemetry, Jewish Cemetry, Doly Cemetry) are connected with the rivers to a different degree and build an significant part of the composition of the city. In the spatial development plan – a master plan for the city of Lodz from 1993, these elements were the main ‘ingredient’ and started an idea of a so called ‘green cultural identity ring’. The valleys of Lodka and Jasien – these two most important Lodz rivers, strongly connected with the industrial pedigree of the city, – became, only partly on purpose, the urban composition axis connected to historic park layouts. But in the city space the whole greenery system so clearly seen on the map, is not so obvious. Some functional connections are not established, even the ‘natural’ continuity is ‘strenuous’.

The idea implemented in the 1993 Spatial Development Plan established a pattern of “ecological corridors” which needed an opening of passages

Fig.3. New awareness. A new box with city quarter map showing the elements of historic urban structure.

with a well defined urban policy to create a functioning ecological system of the city. The areas of the project embraced the city center as a green ring of cemeteries and parks along the river valleys of Lodka and Jasien. This ring connected historic monuments – factories, palaces etc. – with green areas in a unity. It should be then possible to use the cultural and environmental values of historic parks in a more efficient way. But the plan remained on the paper. The scale of the ring was too big for pedestrians, nobody thought about bicycle ways and the authorities concentrated not on a holistic approach but on small scale punctual activities in the single parks or other elements of the system. The attempt to redefine the image of the city undertaken in the early 1990s, based on the “cultural identity areas” building a ring, circle around the city core was very quickly abandoned by authorities and completely lost in the common consciousness of the city inhabitants.

Nowadays the main idea of reestablishing the values in the cityscape is the so called New City Center. (Master plans, 2014) A huge revitalization project in the western part of the city base on the idea of a covered main train station, a rapid train connection and a new redevelopment of a neglected over 90 ha area of the city. It started to be a real possibility because of economical problems of the state railways, which decided to give up huge areas of land, laying in the middle of the city. The idea for the project started as haphazardly as the old adventures of the heroes of the Reymont’s novel, which describes three Lodzermensch entrepreneurs a Pole, a Jew and a German who wanted to build a factory (without funding). Around 2006/2007 ‘out of the blue’, without any economical research, after a visit from American film director David Lynch, started an idea to build a film studio in the old electricity station and from that point a plan was developed to build or rebuild a new town part starting form old power station area (the first draft was made by Rob Krier). The three ‘actors’ were Lynch, and Marek Żydowicz, the founder of Cameramage Festival (then based in Lodz) and Andrzej Walczak, architect and a very successful businessman. Their new projects of ‘sign’ buildings contributed Frank Gehry and Daniel Libeskind (both familiarly connected to Lodz). The ideas change constantly. The projects of Gehry and Liebeskind at the moment will be not realized. The politicians argue every day. The people who started the plan got estranged. The railway station underground project should have been finished in 2015 (the date was thought definite because the funding came from the EU, but at the moment the new deadline is 2017). The city is aiming at the next revitalization EXPO 2020 (NCL presentation, 2014).

This and other revitalization projects of the industrial estates and tenement houses brought into the city the problems of gentrification and the displacement of the old residents. And the problems of the authenticity of space (which started with the redevelopment of the Manufaktura center).

But still the most important matter remains the unfamiliarity of the multicultural past. The homogenous postwar society consisting mostly of new wave of immigrants from rural areas was unaware of the recent history. The buildings and streets of the city remained just walls and pavements, annoying then unattended. Otherwise not really acknowledged.
And for just such citizens such cultural ventures as a Festival of Three Nations which quickly changed its name into Four Nations, integrating also Russian influences, brought the most important change. Slowly, steadily the situation changes but the time is pressing. The city substance neglected after the Second World War is literally imploding, together with conscious demolition the chance to preserve the spirit of the industrial city is very short-lived.

3. THE EXPERIENCE OF SPACE

As stated in the beginning, a landscape and the experience of it are something very personal. Such experience is different when coming from everyday routine, different when the space builds only a tourist attraction or is renovated as a nearly perfect historic scenery for hipsters. What is important, it is the memory of personal life. Of things happening. According to Sharon Zukin who explores the identity of a city through the notion of authenticity “origins” (of a place) suggests (…) a moral right to that city enables people to put down the roots. This is the right to inhabit a space, not just to consume it as an experience. Authenticity in this sense is not a stage set of historic buildings (…); it’s a continuous process of living and working, a gradual buildup of everyday experience that neighbors and buildings that are here today will be here tomorrow. A city loses its soul when this continuity is broken’ (Zukin 2010: 6).

The efforts to sustain as a market force can drive toward the creation an environment which is perceived as globally attractive but no longer locally valuable as the source of the identity and the real growth driving force.

Built environment creates the limits of our activities – it can enlarge or tunnel our vision of how to live our live to make it successful. Even when we have to define what we do understand as the ‘real’ success. Cultural heritage of previous generations which could be visible in multifaceted ways of surrounding space can only enrich our present.

Built space is experienced. Its impact is not always perceived but unconsciously felt. Such unconscious perception allows to appreciate the form and its completeness, the usage of space and its climate, but only in its momentarily state. Without the knowledge of the past the meaning of the cultural heritage ‘closed in stones’ remains outside the perceived world. Only the surface remains, the hidden heritage remains unfamiliar.
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EVERYTHING FEARS TIME, BUT TIME FEARS THE CIRCLES: 
7 THOUSAND YEARS OLD PREHISTORIC ENCLOSURES IN 
LANDSCAPE OF SOUTHERN CARPATHIAN BASIN

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ABSTRACT
From the Late Neolithic in the 6th millennium BC in Carpathian Basin developed circular fortified settlements, some of which in long term eventually grow into settlement mounds, tells. Our modern perception, which is developed from some of extraordinary examples of settlement mounds dominating the landscape, is only partly accurate since only some tells reached a significant height, and they are usually part of the complex settlement structure which surrounds them. Much more stays hidden in landscape and this presentation aims to investigate changing perceptions on Neolithic landscapes in eastern Croatia and to reconsider the dynamics of human-environment interactions. It will also explore possibilities of landscape reconstructions by mapping the specific Neolithic settlements through aerial remote sensing approaches.

Keywords
Prehistoric enclosures, Neolithic, Sopot culture, remote sensing, monument protection

1. INTRODUCTION
Ditches, moats and canals which surround the Neolithic settlements, can be interpreted functionally in different ways - as defensive, economic (cattle enclosure) or even as a water supply system (Roob 2007). Their symbolic role is undeniable, since they mark the border between the community and its environment and develop a sense of belonging to the community (Roob 2007). The construction of the ditch was, at the same time, the symbolic and the social venture, considering that it demanded enormous efforts - it is estimated that the excavation of the trench around the small settlement required between 3500 and 6000 working hours, especially knowing that the average settlement consisted of 60 to 90 residents (Chapman 1989: 36; Roob 2007). The main criteria for the interpretation of the function of the ditches are their dimensions, thus the defensive function requires a greater depth and (or) width in relation to the ditches used for economic purposes.

Ditches occur equally at lowland settlements as at those on hills, like Ivandvor and Štrbinci, (Balen et al 2009: 28; Leleković 2009: 59). During the construction of fortification systems the advantages of the terrain and natural barriers were taken into account, thus the settlement on site Sopot probably used old riverbed of the Bosut River as part of the defence system.

From the late 6th millennium BC in Carpathian Basin developed circular enclosed settlements, some of which in long term eventually grow into settlement mounds, tells. Our knowledge about this phenomena increased significantly in past decades.
Previous research suggest that the settlements of the Sopot culture, in its earliest stage, retain the characteristics of the typical lowland settlements of the Starčevo culture and that at a later stage of the Sopot culture there are significant changes (Dimitrijević 1979: 272). It is now believed that the moats around the settlements were also present in much earlier stages. Thus, in the eastern areas of the Sopot culture first lowland fortified settlements in this part of Europe may be found (Težak-Gregl 1998: 88). These are oval-shaped settlements fortified by a palisade and a ditch (i.e. *Wasserburg*) located in the lowlands of the Bosut (Sopot, Orolik, Privlaka, Otok), Vuka (Gaboš, Ostrovo) and Drava (Osijek - Hermanov Vinograd) rivers (Dimitrijević 1979: 270).

### 1.1. Remarks / Methodology

Detailed analysis of all available old and modern maps, satellite imagery and aerial photography provided data of strategic use of landscape during Sopot culture of the late Neolithic on enclosures which are situated in Slavonia region of eastern Croatia. The enclosures are approximately 150-200 meters in diameter and, sometimes found in pair, and new research shows rarely combination of three or even four enclosures. The paper is focusing on results of the analysis of satellite imagery and aerial photography, also showing achieved results during the low altitude aerial survey. The satellite imagery and aerial photography data were analyzed to examine any kind of correlation between environmental, archaeological and satellite aerial images data and the results were compared with the results of the field survey that was conducted on Neolithic enclosures.

### 2. CONTENTS

Since the scope of this paper is limited it does not allow the presentation of all known and discovered prehistoric circular enclosures in Slavonia. As the result of that, only the selection of the most significant examples which best reflect the extent of the changes that can be traced through the recent historical times and modernity, have been included. Urban development and the building activities that can be followed
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through last five decades on the featured examples from Josipovac, Osijek, Čepin and Klisa, show all the
dramatics of rapid urban development which seriously threaten and damage these seven thousand years
old sites.

Site Klisa - Airport consists of two circular enclosures in the literature known as Klisa Brdo (Hill) and
Klisa - Groblje (Cemetery) (Šiljeg and Kalafatić 2015). Its height above the surrounding area got attention
from early cartographers and was recorded in the Austrian military maps from 18th century onwards
(Fig. 2). East enclosure covers an area of 12 hectares and consists of three concentric ditches, the largest
of which has a diameter of 390 meters and width of 13 m, the middle has a diameter of 200 m and 16 m
wide, and inner has diameter of 69 m and a width of 2 m. The western circle occupies an area of 8 hectares
and also has three concentric ditches of which the largest has 320 meters in diameter and width of 13 m,
middle ditch has 190 m in diameter and width of 13 m, and the inner ditch 108 m in diameter and width
of 2 m (Fig. 3). Both sites have been among the largest Neolithic tells in eastern Croatia, but for the most
part been destroyed by building the airport Osijek in late seventies and early eighties of the 20th century
(Fig. 4). Rescue archaeological excavations were carried out on a very small area and found few meters
thick layer of Sopot culture, and at the top of one site medieval cemetery. The paradox is that the airport for
which the sites have been destroyed today operates on the edge of profitability because it is made without
serious economic calculation.

Site Hermanov vinograd (Herman's vineyard) has dimensions 170 x 145 m and occupies an area of
1.9 ha. It is known for a hundred years in the literature, and the construction of the Osijek motorway bypass
road and other communal infrastructure largely destroyed site(Fig. 6 and 7). Numerous rescue excavations
are conducted on this site, the last in 2014. Site is marked already on maps from the 19th century (Fig.5).

Čepin - Grahorište occupies an area of 2.7 ha consisting of two concentric ditches of which external
has 195 m in diameter and width of 12 m, while the internal has 110 m in diameter of (Fig.8 and 11). The
site is now intensively plowed and outer prehistoric ditch even today retains water and makes it difficult for
plowing and every year canals are dig to drain water (and damage the site) (Fig.12).

Fig.2. Klisa - airport. Military survey of the Habsburg Empire.The first Military Survey (1763-1787).
Fig. 3. Klisa - airport, vertical orthophotography, before 15. 02. 1968.

Fig. 4. Klisa - airport, Google Earth image, access 19. 05. 2015.
Fig. 5. Osijek - Hermanov Vinograd, Military survey of the Habsburg Empire. The second Military Survey (1806-1869).

Fig. 6. Osijek - Hermanov vinograd, vertical orthophotography, before 15.02.1968.
Fig. 7. Osijek - Hermanov vinograd vertical image of State Geodetic Administration (Croatia), 24. 07. 2009.

Fig. 8. Čepin - Orašje and Čepin - Grahorište, Josipovac - Vinograd, Military survey of the Habsburg Empire. The second Military Survey (1806-1869).
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Fig. 9. Čepin - Orašje, vertical orthophotography, before 15. 02. 1968.

Fig. 10. Čepin - Orašje, vertical image of State Geodetic Administration (Croatia), 24. 07. 2009.
Fig. 11. Čepin - Grahorište, vertical orthophotography, before 15. 02. 1968.

Fig. 12. Čepin - Grahorište oblique image (photo: H. Kalafatić, 10. 06. 2015.).
Čepin - Orašje occupies an area of 2.3 hectares and has a ditch of 170 m in diameter (Fig. 8 and 9). During the construction of Čepin motorway bypass was cut in two parts and damaged (Fig. 10). Site is not discovered during the construction of the road in 2000.

Josipovac - Vinograd (Vineyard) is site higher above the surrounding terrain and has an area of 8.3 hectares and has a ditch 325 m in diameter and a width of 13 m. Site is today situated among the three drainage canals that were built to drain water from a large prehistoric ditch (Fig. 13 and 14).

Proportions of the enclosed settlements known from older literature, measured between the two ditches, show relatively large dimensions. Thus, at the site Sopot dimensions amount to 155 x 115 meters, at the site Otok 165 x 155 meters, while at Hermanov Vinograd dimensions are 120 x 120 meters (Dimitrijević 1979: 270-271). Today, due to advanced techniques of remote sensing, these measurements can be corrected without excavations, and it has been determined that the true dimensions of the site Hermanov Vinograd (Fig. 6 and 7) were larger (mentioned above), and also that there existed another enclosure, also a tell site (Fig. 6, left arrow), on the west side of the known site.

The common question is always what processes determine which enclosure will become a tell-site with rich and few meters high cultural layers and which site will remain without the cultural layer. Is it just a matter of the geological processes, different sedimentation, the intensity of agricultural cultivation or primarily a result of the length of the human settlement on a certain location? The example of two enclosures from Čepin (sites Grahorište and Orašje), which are situated close to each other and for which it can be, with high probability, claimed that they were cultivated with the same intensity, indicates that the difference in amount of the findings on their surface shows the intensity and, probably the durability, of their settlement. The enclosure at the position Orašje yielded surface findings and does not, in height, stand out from the surrounding plains, while the enclosure at the position Grahorište is significantly higher in comparison with its surroundings and has a significantly higher number of surface findings.
Another reason for the different thickness of the cultural layer and the number of findings on an individual circle may also be a variety of functions for which they were designed and used, and for which their main common characteristic, a wide circular ditch, may not be relevant.

3. CONCLUSIONS

Case studies presented in paper show significantly accelerated and increased impact on prehistoric sites in last decades. Remote sensing techniques provide good foundation not only for discovering of new archaeological sites, but also for monitoring of urban development impact on already known sites. It is also shown that proper urban planning is best way to protect monuments and cultural heritage.

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MODIFYING LANDSCAPE: QUARRIES AND INFRASTRUCTURES IN THE MIDDLE AGE MEDITERRANEAN AREA

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ABSTRACT
The quarries are an important key to highlight diachronic changes in landscape. Infrastructures linked to quarries are mainly represented by the road network, as street, maritime or fluvial roads. In this paper I present some case-studies, highlighting the different intensity of the landscape changes between 11th and 14th in Mediterranean mountains. They are in Apennines and Monte Amiata in Italy and in Petra region, in Jordan. The methodology is related to the Light Archaeology, i.e. a kind of environmental archaeology with particularly attention to the stratigraphy of upstanding buildings. The case-studies in Italy put in light different forms of environmental exploitation in the same period (different types of quarry, for size and form, in Monte Amiata; and different infrastructures, like fluvial or terrestrial roads, in Apennines). The case-studies in Jordan, where the research is still underway, show exploitation on site. The main goal of the paper will be analyze these different cases-studies to propose a possible interpretative model of the quarries like a key to understand ancient and actual landscape.

Keywords
Medieval Archaeology, Archaeology of production, Light Archaeology, Quarry

1. INTRODUCTION
The study of a specific production cycle, as the building stone’s one, allows to diachronically verify, on long term, if and how the characters of a territory have been firstly assessed and then modified, under which economical and social logics and to what purpose. The attempt to immerse the actualization of a technological process in the historical dimension, defining the variations throughout time, results significant in order to understand how the different social formations interacted with the territory and how they modified it. Quarries (as well as mines) have been getting the academics’ attention for a long time, especially for what concerns the ancient age (Greek-Roman) and, in a fragmented fashion, the Middle Ages (Francovich 1993, Stagno, 2013). The Italian archeological literature on the Middle Ages used a double approach in the study of this topic, analyzing specific lithotypes at the local level, mainly through long term research, sometimes aiming to support the re-opening of profitable business, or in relation to the exploitation of particular types of stone for the construction of historically and archaeologically relevant buildings (Pruno 2008).

The development of architectural archaeology (Brogiolo and Cagnana, 2012) highlighted the economic driving force and social mark role of the production cycle of the stone, from the quarry exploitation, until its implementation. This cycle implies, according to its nature, a strong influence on the territory, both for the progressive depletion of raw material, and for the infrastructural modification, which are often necessary in the stone’s transportation phase from the mining site, to the usage site. In the past few years, thanks to a series of projects conducted by a different research groups, a prolific investigation
branch, archaeology of environmental resources, was born, and research focusing on the quarries’ history analysis, can be usefully included within its perspective. Archaeology of environmental resources is in fact aiming at the reconstruction of the environmental resources’ management and activation practices in the different historical production systems, starting from the study of the effects that such practices (and their abandonment) have on the ecology of the considered sites (Stagno 2013).

This paper presents the results of three projects, one of which still in progress, in three different mediterranean areas: the first two are in Italy, one on the Appennins “tosco-romagnolo” and the other one on the Mount Amiata (Nucciotti, 2005, Pruno, 2008), in southern Tuscany, while the third one regards the Petra and Shawbak valley in Jordan (Vannini 2007, Vannini and Nucciotti 2009, Vannini and Nucciotti 2011).

In the Light Archaeology perspective (Vannini and Nucciotti 2009), these projects try to analyze the landscape’s connection to the exploitation of building stones resources, in relation with the presence of medieval settlements, through the study of the exploitation of environmental resources: in the Appennins “tosco-romagnolo”, the landscape is connected to the Guidi counts’ family, the Mount Amiata to the Aldobrandeschi’s family, and in Jordan, evidences coming from the analysis of the 12th-13th century settlement, show that the landscape was molded between the Crusader and the Ayyubid power. In all three cases, the work is on micro-territorial scale, in order to analyze the management practices, the effective modifications, and to glimpse the social backgrounds that worked as driving force (Stagno 2013).

2. MEDITERRANEAN QUARRIES: SOME CASE-STUDIES

In Italy, the work focused on two mountainous environments, the first on the Appennins “tosco-romagnolo” and the second on the Mount Amiata, in southern Tuscany. In both cases, the research backed its purposes on the necessity to answer a specific question, regarding the provision of building material within the settlement logics of two important noble families, respectively the Guidi counts on the Appennins “tosco-
romagnolo”, and the Aldobrandeschi family on the Mount Amiata. Therefore, these studies were not born aiming to assess the exploitation of environmental resources, but could instead be placed in the field of power and production archaeology (Mannoni and Giannichedda 2006), even though, while working on the territory, the boundaries became less defined.

2.1. Appennines between Tuscany and Romagn

The territory chosen on the Appennins “tosco-romagnolo” has its center in the site of Modigliana. The historical importance of this area is due to the territorial origin of the Guidi counts, whose Modigliana castle has been proven to be the birthplace of the family’s noble power (Vannini and Molducci 2009). The importance to analyze the historical events and to contextualize the territory from a socio-productive point of view is therefore evident. The research on the exploitation of the stone resources on building purposes in the context of the Modigliana castle, starts from the authentication of the possibility to choose between two different lithotypes, both present on the territory: sandstone and “spungone”.

2.1.1. Sandstone fluvial quarries

The study of the territory has been structured through regular and selective explorations in the area traced by the hydrographic network of Marzano, Acerreta, Lamone, Albonello and Samoggia valleys. In the Acerreta’s catchment basin, and more precisely inside its current riverbed, two sandstone’s extraction sites have been identified (the first one at Mulino Vallamento, the second one in the Modigliana residential area): in both cases regular blocks and signs of mining have been identified. The signs appear smoothed by the water, so it results difficult to recognize the type of tool employed and its dimensions.

However, it is almost certain that the signs have been caused by wedges, points and a very regular pointed tool, that can possibly be assimilated to the one used both in medieval quarries and more recently in mines. Their current position, in the Accerreta’s riverbed, makes them relevant in relation to the
discussion concerning the resources’ exploitation: the choice to use inland navigation, faster and more economical, for the transportation of building material. The unresolved problem in this study concerns the definition of an extractions’ specific dating, besides assessing that it refers to a broad pre-industrial period. However, it is necessary to highlight the strict procurement necessities during the different building phases of Modigliana’s castle: this site is short distance and had for a long time the necessity to supply sandstone. Although, it is possible to hypothesize a link among the different castle’s building factories and the exploitation of fluvial quarries on the Acerreta.

2.1.2. Spungone lithotype quarries

The considered territory is endowed with a vast presence of a stone locally called “spungone”, which has been variously used from the classic age not only as building stone, but also as component for mortar. Two quarries have been taken into account, both used in medieval epoch. The first one is nearby the Ceparano castle and it represented its provision site for building material. Also in this case, the logic appears to be linked to the ease in obtaining the material, namely, in loco acquisition.

The second interesting spungone quarry is the one in Santa Maria in Valle. It consists in wide side portions that present different signs of extraction, as well as an area, currently inside the woods, where blocks of different sizes with signs of extraction or semi-finished and processed relics have been found. The processing signs, permitted to recognize the presence of wedge trails and trails ascribable to the bi-functional tool for quarries and mines. In this case, it is possible to hypothesize a less intense use of the quarry areas, but extended throughout time, as the different open spots suggest, as if the purpose was to test the raw material, but also to continue the extraction in different spots, after the depletion of the first lodes.

Fig.3. Tool markers of Ceparano castle quarry.
2.2. Western Mount Amiata

The western Mount Amiata case-study presents a higher level of completeness (Pruno 2008), of which only the elements that result pertinent to the current topic will be highlighted. The research consisted in an investigation in a historically relevant area, characterized by the use of trachyte for building purposes during the Middle Ages. The investigation was conducted on the provision sites in order to analyze the extraction modalities and, when possible, to determine the link between the quarry’s exploitation and their management. An interesting territorial feature consists in the fact that some of the sites taken into account, where the trachyte use for military and religious building purposes was exclusive, are located outside the trachyte’s geological area. Compared to the other territories taken into account, this one presents a contrasting element, since in the other cases, the quarries were used to build in forthcoming areas or even on the quarry’s site. This element appears to be significant to the purpose to conduct an investigation aiming to understand the exploitation and management modalities, because it highlights the will to use a specific lithotype, not easily reachable. The analysis conducted through surveys, led to individuate two different exploitation modalities: quarries and petriere (Nucciotti 2005 ; Pruno 2008). In particular, two examples have been selected: the San Biagio di Gravilona quarry (in the area surrounding Castel del Piano) and the “Le Cannuccie” petriera (municipality of Arcidosso). The quarry typology, represented by San Biagio di Gravilona, consists in an exploitation of the stone façades, exposed through lithotype samples, and then with mining operations following the traditional stone production modalities; the second one, the petriera, consists instead in erratic ground blocks of trachyte, some of which of big dimensions, that have been exploited for the material’s extraction to the point to reduce them to the current planking level (to recognize these extracting typologies, consider (Lukas 2002 ; Gutierrez and Garcia 2013).

2.2.1. San Biagio di Gravilona Quarry

Gravilona’s trachyte quarry, in Castel del Piano, located right behind S. Biagio’s Church and nearby of a small, well-preserved medieval building (probably dated back to the 12th century), is in an area that has been property of the San Salvatore’s Abbey from the 10th to the 18th century. The quarry area is quite wide (about 300mt. with a height of 30mt.), with numerous cuts and visible negative signs. Currently, the area presents a chestnut plantation and it is located 550mt. above the sea. The quarry’s façade consists in a rocky side with signs of natural and, mainly, human-related detachment. The processing signs present different intensities and dispositions on the façade, in particular, wedge accommodations and signs of detachment have been recognized. In front of the façade is the quarry service area, characterized by cantilevers and stockpiles of lithic material of different dimensions and processing. Another area, presents blocks with signs of recent extraction. The written documentation, mentions the San Biagio’s area as property of the San Salvatore’s Abbey, become manor before 1076 (Pruno 2008). Furthermore, on the site where the trachyte extraction quarry is located, there are two buildings: a church, from which derives the place’s toponym, and what resembles a chestnut drying-room. The San Biagio’s area seems to be topographically distinguishable in two portions, the boundary of which is created by these two parallel buildings. In fact, while behind the buildings are located, besides the quarry’s façade, the semi finished and waste products’ areas, all lacking of recent tool signs, before the buildings are present transported blocks (for the construction of dry stacks) with recent signs. The dating of the two buildings, allows us to hypothesize a plausible period concerning the conclusion of the quarry operations. The masonry’s stratigraphic analysis, highlighted two medieval phases and a post-medieval phase. In particular, the most ancient buildings’ phases date back to the 12th century, and this fact corroborates the possibility of a not successive quarry’s utilization.
2.2.2. The petraries: Le Cannuccie’s case

The other individuated typology, petriera, namely outcrops of erratic trachyte boulders which were exploited for a very long period, has been the focus of an investigation based on oral depictions by stone cutters who took part to the building of big constructions in Santa Flora (which is inside the reference territory for our research), between 1930 and the post-World War II era. They reported that stone production took place in “scattered” quarries, using erratic boulders, which were widespread in the nearby forests. Using this method, it is possible to avoid the detachment phase, taking advantage of the natural presence of surfacing and/or erratic blocks. Le Cannuccie is an area rich of erratic boulders and trachyte surfacing, with signs of extraction.

The surfacing’s (natural and erratic) are concentrated at the terracing’s crumble limit, a vaguely elliptically-shaped area of 170x20 meters. In this case, like in Gravilona, the area is used as chestnut grove. Some important considerations emerged from the attempt to outline the distinction criteria between anthropically exploited blocks and blocks that experienced natural detachment and examining the petriera. Also in this case, the first step consisted in distinguishing the topographically homogeneous areas, in order to understand whether an exploitation distribution logic existed. Six areas have been identified, of which the main difference regards the progress of the extraction process. One of the indicators used to
determine the exploitation level, is the consideration of the blocks’ level compared to the ground level (from 6 to 2mt, until the current planking level). Clearly, it is much more difficult to assess a dating for the exploitation of the *petriera*. In fact, there are missing elements to create at least a range. It is possible, however, to make a few considerations: there are exclusively traces of points that created wedge cavities, and when signs of mining levers are present, the tool has never been used accordingly to the modern pattern. The second observation, regards the blocks morphology. Firstly, it is necessary to consider their dimensions: those who have evidently not been exploited have significant dimensions, with heights until 2.5mt and width of about 2mt. However, the blocks in the exploited area, are in many cases lowered to the ground level. Furthermore, it is necessary to consider also the curvature level of the extraction signs and the evident angles’ rounding, created by the cuts. Although trachyte is very porous and barely preserves the tools signs, in the case of petraries, the use of which in the post-World War II is reported by numerous oral sources, a typical element of cutting signs is represented by their sharpness. It mainly consists in extremely sharp signs, that are absolutely not present in the Le Cannuccie’s case. Therefore, it is possible to plausibly hypothesize a pre-modern period use.

**2.3. Transjordan: the Petra and Shawbak cases**

These two last case-studies concern an in-progress research, so the datas and the considerations are provisional. The research concerns the medieval building phases in the 12th-13th century in the Petra and Shawbak area (Vannini 2007; Vannini and Nucciotti 2009). The aim is to identify similarities and divergences in the exploitation of environmental resources during the political transition between Crusaders and Ayyubids. This topic is studied through the analysis of the quarries used for the extraction of building material, the first in the al Habis medieval settlement inside the city of Petra, and the second one in the Shawbak castle, through the identification of extraction activities that may be linked to the crusading phase.
2.3.1. Al-Habis, Petra

The Crusaders’ settlement in Petra, is a topic that has been longly analyzed during our mission, since the research started from the medieval Petra’s retake. For what concerns the building stones exploitation, it is clear how complex is the case regarding this area. Recently, an important study on the classical period conducted by Bessac (Bessac 2009) has been concluded. It is a fundamental study that permits to understand the extraction modalities for cave construction and the exploitation of building stones. For what concerns the al-Habis case, during the research resume that took place in November 2015 through systematic expeditions on site, it has been possible to recognize at least two quarry areas: the first one located in a plain in lower position compared to the settlement, and another one nearby the city walls. The first one seems to have been object of intensive exploitation (as can be deduced by the almost total horizontality of the ground level), while in the second case, blocks with evident signs of detachment are present. Both cases require specific studies that are still in progress, but it is possible to highlight the choice to build on the quarry’s site (this aspect has been highlighted by Bessac in relation to the periods preceding the crusade’s settlement in the roman-Nabataean city area).

2.3.2. Shawbak

Shawbak is a case of high interest, due to the prolonged occupation of rather different political groups, that protracted until the mid decades of 1900 (Vannini 2007; Vannini and Nucciotti 2009). The constant communication between the different occupying political players, often foreigners, and the local semi-nomadic inhabitants, that consisted in the constant reference point for the exploitation of environmental resources, is an interesting historical feature documented by archaeological documentation, especially in order to define the exploitation of environmental resources (La Bianca 2007; Pruno c.s.). The interest of this work, however, is not represented by the analysis of the characteristics of the exploitation of stone material in a pre-medieval and mamluk period, with the opening of quarry’s façade that are still visible in the territory.
nearby the castle. The interest concerns a small flint extraction area, identified thanks to a stratigraphic excavation, that has been active in the crusader’s palace for years. The focus is on the fact that it has been excavated, therefore there is the possibility to obtain reliable stratigraphic information, besides the fact that, from the wall analysis, it is possible to deduce that the flint use has been concentrated in the 12th century masonry. The investigated area presents wedge-related signs and the stratigraphy allows us to locate this activity in a construction phase, concerning the edifice’s building. It is interesting to highlight, with the study still in progress, that the flint is extracted by lodes which are present in the whole castle’s hill, while the limestones used in the pre and post-crusade’s phase come from the territory, suggesting an alteration concerning the exploitation of environmental resources by different political groups.

Fig. 7. The second example of quarry in al Habis.

Fig. 8. Signs of extraction made by humans.
3. CONCLUSIONS

This excursus on the individuated and studied extraction sites, although the research is on different levels of completeness, allows us to make a few general considerations. First of all, it is necessary to understand which rules were followed in order to exploit the resources. All the examined cases present quarries of small dimensions, the exploitation of which was conducted by the opening of small excavation faces, differently to the methodology used in previous periods, especially in the roman one. In many of the examined cases, the extraction areas are located in the same place where the stone needed to be employed. This choice allows to drastically reduce the necessity of infrastructures. The only exception is represented by the Mount Amiata case, where both the petriera and the quarry analyzed, produced material used for the construction of buildings in Arcidosso (Pruno 2008 ; Nucciotti 2005). The written documentation on the Amiata, shows the existence of a public road access that interested the segment from Gravilona, where the San Biagio quarry is located, in the San Salvatore Abbey’s territory, to Arcidosso (Nucciotti 2005).

Considering the petriera area, first of all Le Cannuccie, which is the area archaeologically investigated, it is necessary to verify an eccentric location in relation to the main road access, also because of its altitude which places it above the quarries. Therefore, the raw material transportation could have been managed through narrow paths, suitable to men and mules but not to wagons. The trachyte’s specific weight is 2 g/cm³, so a 50x30x30 block can weigh 90kg. According to the information provided by Mannoni:“...a mule cannot stand loads superior to 150kg (two 20x20x70cm stones); a couple of oxen can pull a 800-1000kg wagon (a stone block of 100x100x35cm) on roads with sloping inferior to 3%...” (Mannoni 2000). The substantial difference between these two transportation modalities is given by the available type of road; a sloped path required mules, while the possibility to pass through wider and higher quality roads, allowed transportation by wagon, which was more expensive but faster. While the side quarry exploitation typology needs a specific organizational system, there might be the possibility, for petriera not to rely on a construction site’s specific organization, but to coordinate the work according to the extemporaneous necessities, that could be related to the other forest and land activities. It is also possible to hypothesize a relation with a modality connected to some common rights that were maintained for a long time in village communities and that contributed to the territory management. If in the reference territory the lithotype use appears connected to monumental, military, religious and civic buildings for the whole chronological period taken into account, it is possible to highlight a specific workforce’s choice to restock from different places, independently from the building’s distance. About the other cases taken into account, it is necessary to highlight the attention paid to the choice of locations that marry the presence of a good quality material to easy transportation, if not even placing the building site on the quarry. So, in these cases, the effort focused on individuating building materials that did not require complex transportation. From all the analyzed cases, it clearly emerges that the extraction sites analysis can lead to the discovery of peculiar aspects of the societies that exploited them, in a socio-economical and environmental viewpoint of the exploitation of resources.

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BETWEEN HEAVEN AND EARTH.
MONASTERIES IN THE NEGEV DESERT

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ABSTRACT

The desert has always been a very symbolic space in the Jewish culture. Due to its primeval character, as well as the history of the Nation, it was a symbol of the beginning, related to the times of Moses and the Passover from Egypt. Prophets appealed to return to the very origins in their relations with God. On the other hand, the desert was also an evil place inhabited by demons. These meanings were adopted by the Christians. That is the reason why some of them decided to change their lives and go into the wilderness. They wanted to start relationship with God and the desert was perfect for that. They also wanted to fight evil both inside themselves and in the outside world. By erecting monasteries in the deserts, they symbolically defeated demons by repurposing their area for human living. By planting and nurturing seeds, they also defeated death and returned the desert to the period of the Garden of Eden.

What is interesting, in the Negev Desert monks did not only focus on their spiritual purposes, but they were also part of the local community as they helped educating boys and acted as authorities. They showed that there was no point to their work if they were only focused on themselves since no one could attain salvation alone.

Keywords
Monasticism, Negev Desert, Byzantine Period

1. INTRODUCTION

In the Byzantine Period (the end of the 4th century AD – 641) one significant change occurred in the life of the inhabitants of the Roman Empire – Christianity became a national religion and displaced the old, traditional cults. As a result, many churches were built and monastic life developed. It was also a very unstable period in the Levant. Rome was at war with the Parthian Empire and Samaritans rose twice to protect their believers. At the end of that period, Persians invaded the region and destroyed the defence system, which subsequently helped the Arab conquest. Additionally, earthquakes struck the provinces several times. Along with the wars, they contributed to famine and plagues. Death was a common phenomenon for most people. Part of the population decided to break away from that world and look for a safer and more stable place to live. The thick walls of monasteries erected in the desert offered people sanctuaries they could not find in the outside world.

2. THE DESERT: SYMBOLIC AND BIBLICAL MEANING

In Christian tradition, the desert has a very complex meaning. First of all, one should take into consideration its specific, primeval and unfriendly climate. Because of it, the desert very early became the area owned
by demons and evil spirits harming travelers and merchants. This concept was known to Egyptian priests, who linked the desert with Seth – the god of chaos and destruction and the main opponent of fertile Osiris and his son Horus (Wilkinson 2003: 197). From them this idea was adopted by Jews during their stay in Egypt. In the Jewish tradition, which is the root of Christianity, the desert was reigned by the fallen angel Azazel, the demon of the desert to whom Jews sacrificed a goat during Yom Kippur so that he would take away the sins of their nation (Lev 16: 6-10).

However, the desert had also another meaning for them. It was a place of beginning. Like in the time of Moses, when Israelites fled from Egypt and spent forty years in the desert to become a nation. This motive was undertaken by many prophets (e.g. Hosea) who appealed to people to return ‘to the desert’ in their lives and relationships with God – that is, to the times of their unblemished, pristine nature. Because of the sun’s ability to burn the ground dry, the desert also became the symbol of purity, especially religious (Cirlot 1971: 79). Besides, the waste of the desert stood in opposition to fertility - a very important aspect of the agrarian religions of the Jewish neighbors.

All these Jewish interpretations of the desert influenced the Christian tradition. Those of the followers of Jesus who wanted to fight evil not only inside themselves, but also in the surrounding world, became monks and erected monasteries in that ‘devil land’ and fulfilled the prophecy of Isaiah (41,18) that springs – the symbol of life and its beginning – will be on the dry land. They also believed that as the sun destroyed living organisms on the desert, the soul should destroy all sinful aspects of the body. This was influenced by the Manichean ideology based on dualism and as such was always considered a heresy against the belief of God’s creation of human as the unity of both body and soul. Despite that, it gained popularity in some periods in the Christian theology. By living in the desert, the monks wanted to cut themselves off from the influences of the material world and find a way to deepen the relation with God they believed in. It is worth mentioning that the Jews spent time in the Negev before they entered the Canaan. Due to that fact, the desert received one more symbolic meaning – it was the last stage on the spiritual road from Egypt – the symbol of slavery and sin – to the Promised Land of freedom guaranteed by God.

3. THE NEGEV DESERT: A CASE STUDY

Human settlements in the Negev started at the end of the third millennium BC and strata dating back to the eighth century BC reveal evidence of incense trade (Erickson-Gini 2010: 35). The control of this very lucrative process was probably the main reason why city like Elusa or towns like Oboda, founded by the Nabateans, continued to develop despite the very hostile climate of the Byzantine Period. However, as can be said in the light of the present research, next to them new settlements - mostly Christian monasteries - started to fill the free space. There arises the question of why people decided to leave their previous living areas and move to new and unfriendly environment.

3.1. Geology and Climate

The geological structure of the Negev desert was influenced by two main factors: the Afro-Syrian Rift and the sedimentation of carbonates from the Tethys Ocean (Erickson-Gini 2010: 1). In the late Cretaceous and Tertiary period, a series of faults and folds created from the region of the Euphrates River through the Sinai were deposited, covering the whole Negev. In Quaternary, there appeared deposits of loessial soil, which in the Byzantine and Early Islamic periods enabled cultivation using run-off farming methods. Due to the instability of western and southern dunes, part of the sites were covered by sand from the end of the sixth century and the road connecting Beer Sheva with Kadesh Barnea lost its importance. Very interesting are three geomorphologic units: Makhtesh Ramon, Makhtesh Gadol and Makhtesh Katan, that are not results of a volcano eruption or a meteorite impact, but water erosion.
Negev is a stone desert crisscrossed by many valleys (arab: wadi) and can be divided into five soil regions. In the North there are fairly fertile soils suitable for cultivation. In the western part of the region the quality of soil is poorer and sandy soils are more common. What can also be found in the Central Negev are loessial soils of a very low permeability and quite a high level of erosion. In the Highlands and in the Arabah Valley most common are salty soils preventing extensive cultivation.

Hunnington (1911: 258) assumed that the cooling of the climate during the Roman Period enabled agriculture in that and the following period. This hypothesis, questioned even by contemporary researchers (Woolley 1914-1915: 33), can be rejected after the analysis of the fluctuation of the Dead Sea water level which shows that at the end of the first century AD the climate in the Negev Desert started gradually drying (Bruins 1994: 307-308; Parker 1999: 139; Rosen 2000: 55; Erickson-Gini 2010: 4). This process stopped in the end of the third and the beginning of the fourth century, and the climate in the Byzantine Period was not different from today. The average annual temperature is around 27°C and precipitation stands at 15-20 mm per year in the Negev Highlands and less than 1 mm in the Arabah Valley. These high temperatures, together with the low quality of the soil, forced the nomadic-pastoral society and sedentary farmers to develop a water-collecting system (Erickson-Gini 2010: 4). There are two group of aquifers in the Negev. The first one is related to the Arabah Valley and is characterized by poor quality water of high salinity. Water to the Hazeva Dune and the alluvial fill of the valley both in the North and South is supplied through underground streams. The second group are wells in the Central Negev replenished by the water flowing underground from the north-western slopes of the Judean Highlands toward the Beer Sheva area. Springs are very uncommon in the Negev Highlands and they are concentrated in the area of Sede Boqer and Kadesh Barnea. Many of the wells in this region were carved in bedrock, sometimes at the depth of at least 60 meters to reach the water table (Woolley 1914-1915: 131). It looks similar to a few other cities, e.g. Shivta, where the only source of water were tanks collecting winter rains. Y. Kedar (1957) calculated that four liters of water per day was probably sufficient for one person to live and function in ancient Shivta. Unfortunately, neither his calculation nor the above mentioned ‘tank-theory’ can be confirmed since any archaeological excavations conducted there had to be suspended due to the lack of access to water.

3.2. The monastic movement

The aspects of the beginning and purity were the reasons why Jesus of Nazareth, who was additionally struggling with the devil (Mt 4,1-11 and similar in other gospels), and Paul of Tarsus (Ga 1, 15-17) started their mission in the desert. Christians who wanted to begin their relationship with God also chose to go into wilderness. The monastic movement started in Egypt at the end of the third or the beginning of the fourth century and rapidly spread all over the world (Bacchus 1913: 464). An important change in the movement was made by St. Pachomius who put particular emphasis on the coenobitical aspect over the individual life in monasteries founded by him. However, it has to be said that the eremitical, not coenobitical, monasticism moved forth from Egypt and arrived in the Palestine, Gaza, Antioch, Mesopotamia and Cyprus (Bacchus 1913: 466). Later, St. Basil of Caesarea was the one who instilled the coenobitical model in the above-mentioned regions, and stressed the importance of the law of charity and the idea of dependence on another person. He opened St. Pachomius’ style to the world and brought monks back to the society, where they worked at schools and helped the poor (Figueras 1995: 430).

This second model is closer to that for monks from the Negev Desert, which could be seen in the monastery plan. Monks lived in two types of monasteries. One, where they spent the majority of their time, was a complex of buildings with a chapel or a church, dormitories, a warehouse, storerooms etc., similar to a typical image of a monastery rooted in common perception. The second type was laura, a small hermitage that was mostly carved in the rock. One monk or a very small community could live there for some period, when they spent some time in solitude in specific retreats. The laurae were situated at some distance from the original monastery like Mitzpe Shivta or ‘Ein ‘Avdat. Each consisted of a room for the
inhabitant (cella), some space for cultic use (sometimes a chapel) and some other rooms (e.g. storeroom). Both laurae and monasteries were protected by walls and a watchtower and were erected within close distance from the water source – a well or a river bank. This protected their inhabitants not only from bandits and nomads, but also from natural climate conditions, supplying them with water and enabling the cultivation of cereals and vine.

Groups of monks took care of pilgrims and tourists who travelled to places considered holy in their religion. Negev is on route from Palestine to Sinai Peninsula – both are very important for Christianity and Judaism. It was also the main trade route, connecting the Levant, Egypt and far eastern regions. It cannot be excluded that merchants along with pilgrims enjoyed the monks’ hospitality and took rest in pilgrim houses in monasteries similarly like in caravanserais.

Negevian monks also took care of local societies living in the cities. Monasteries were located on the borders of cities to emphasize their separation from the world, but close enough to celebrate masses and services to fulfill the religious needs of the inhabitants. Papyri of Nessana inform us that the civil administration was also in the hands of the Church authorities and was based on monastic institutions. What may prove this assumption is Papyrus 73 addressed by the Muslim governor of Gaza to the people of Nessana, which was found in the premises of the monastery of St. Sergius and Bacchus, whose supervisor held the title of hegoumenos (Figueras 1995: 430). Another letter, written by Abu-Rashid, indicates that the abbot of St. Sergius monastery was perceived as the mayor of the city (Figueras 2013: 110). Another few pages of Vergil poems and Latin-Greek Dictionary, as well as two writing tables with wax layers and some words scratched on them were found there. All of them could point to the existence of Nessana school for boys and it might be interpreted that the monastery was not only the religious but also the cultural centre of the city.

Papyri also confirmed the cultivation of fields and vineyards by monks to provide basic goods for life and trade. The main plants cultivated in the Nessana region were wheat, barley, aracus, as well as olives, figs and grapes (Mayerson 1962: 227-229). Grapes are very interesting because of the amount of water needed for them to grow. In Shivta, where no wells or tanks have been found, at least two vineyards - one of which was related to the monastery (Figueras 1995: 439) - are still visible on the surface. Transporting grapes from other cities was possible but it seems to have been unprofitable due to the climate conditions. It is more probable that there was another source of water that remains undiscovered but, as it was mentioned above, excavations there are almost impossible to conduct.

4. CONCLUSIONS

Since the old times, the desert - hostile to any kind of a living creature – has been a symbol of primeval and harmful forces. Burnt by sun, with soils of very poor quality and limited amount of water, it did not offer good conditions to the developing civilization. Paradoxically, in case of the Negev Desert, those features were sought by Christian monks who during the Byzantine Period would go into wilderness and erected communities which through prayer and work helped them build their relations with God and people around them, bringing into earth the Heavenly Kingdom of righteousness, peace and joy in the Holy Spirit (Rom 14,17b).

BIBLIOGRAPHY


ROCK-CUT MONASTERIES – ORIGINAL LANDSCAPE FOR A SPECIFIC RELIGIOUS ENVIRONMENT. A CASE OF THE REPUBLIC OF MOLDOVA

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ABSTRACT
The paper discusses the rock-cut architecture phenomenon from the Republic of Moldova. The landscape played the most important role in developing hermitages and monastic communities, their infrastructures, religious, social and economic activities. Another important aspect is the chronology, which is a debated question, because written sources mention such sites very late and some scholars have been trying to link this phenomenon with early monasticism. The building time of these complexes is not clearly established, but their existence certainty can be framed with medieval state of Moldova. In this context, it is particularly important to place the rock-cut sites from Moldova in their broader geographical context, which would mean an examination and presentation of the elements of such architecture from South-Eastern Europe. The paper describes most important hermitages from the Republic of Moldova – Japca, Saharna, Țipova and Orheiul Vechi which are placed in the rock blanks of the Dniester and Raut rivers.

Keywords
Rock-cut monasteries, hermitage, landscape, the Republic of Moldova

1. INTRODUCTION
The natural caves are known as the safest natural shelters for human communities from prehistoric times. During the centuries these areas had been adapted and used for various needs. In this context, the rock-cut became a type of architecture linked with a specific life style. Today, the rock-cut architecture represents an important part of universal cultural heritage and a large number of them are continuously taken into special evidence by UNESCO. This type of sites is archaeologically recorded for five to four thousand years BC.

In the context of the development of Christianity, numerous caves became religious spaces, linked especially with hermitage life and later with monastic activities. The first manifestations of the Christian monasticism were in the eastern Roman provinces. Egypt was a theatre of the asceticism and Anthony (late 3rd c.) was the best known among the so-called Fathers of the Desert. In the 4th century the archbishop of Caesarea, Basil, founded monastic communities in Cappadocia, which became one of the well-known rock-cut monastic centres in the World.

At the beginning of monasticism, natural caves were used, but these have gradually been developed by digging into the cliffs of numerous cells and churches. The caves became not merely a hermitage place for hermits, but developed gradually into spiritual centres where the monks lived and did many religious duties. The phenomenon of religious rock-cut architecture development is widely attested in different parts of Europe. Thus, we find the development of this type of human settlements, particularly in the areas with a specific landscape. The spread of monasticism in South-Eastern Europe was inevitably influenced
by the Eastern precedents. So, most of rock-cut sites located in the Carpathian-Balkan area (ancient sanctuaries, churches, temples, hermitages or medieval monastic complexes) are characteristic for the epoch of the spread of Christianity, some of them maintaining their function until today. Among rock-cut sites from South-Eastern Europe, the religious complexes are attested in limestone banks of the Dniester and Raut rivers too. The sites from Țipova, Saharna, Japca and Orheiul Vechi are the most famous rock-cut hermitages/monasteries from the Republic of Moldova (Fig. 1). The origin of rock-cut monasteries from the Carpathian-Balkan regions, their history, typology, and architectural morphology are insufficiently studied. In this context the rock-cut architecture from the Republic of Moldova presents a great interest due to a number of particularities still unknown to the academic public.

2. SHORT HISTORIOGRAPHY ANALYSIS

The rock-cut sites from the Athos Mountain, Crimea, Georgia, and Armenia are better known than those from the Balkan, Carpathian and the river Dniester area. The sites from Moldova have never been a subject of a complex monographic study. These sites are mentioned in various short papers during the 19th and the 20th centuries. The originality of cave monasteries drew the attention of various travellers and writers, the first general descriptions about the rock-cut sites in Bessarabia (Horodiște, Bulăești, Calaur, Rezina, Japca, etc.) occur only in the 19th century (Vel'tman 1840; Halippa 1902: 98-114; Halippa 1907: 242-298; Nakko 1876: 255-258; Afanas'ev-Čužbinskij 1863: 352; Batjuškov 1892: 39, 99; Afanas'ev-Čužbinskij 1883: 359). A. Zaščuk considers, without any arguments, that the rock-cut monasteries from Bessarabia were hiding places for the early Christians (Zaščuk 1862: 170). Z. C. Arbore assigns in his works some cave churches and monasteries from Bessarabia to early Christian communities, and dates Saharna site the 12th century and Japca site the 17th century (Arbore 1898: 292; Arbore 1904: 194). At the

![Fig.1. Map of mentioned sites from Dniester regions.](image_url)
beginning of the 20th century a work on Bessarabian rock-cut monasteries was done by V. Kurdinovskij. His contribution is the first analytical study, accompanied by drawings and sketches of the described sites, comments and feedback on the appearance and evolution of cave monasteries and link with Byzantium (Kurdinovskij 1906: 1313-1317; Kurdinovskij 1918: 1-11; Kurdinovskij 1925: 18-43).

During Soviet time most churches and monasteries were closed and some of them destroyed. The rock-cut sites from Butuceni and Țițova, for example, were severely damaged by the Soviet authorities. Out of 30 existing monasteries in Bessarabia in the interwar period, under the Soviet regime by 1985 just one remained active. Neglecting the topics related to the religion was a part of Soviet policy and probably this is an argument why they were so poorly discussed. In some works dedicated to architecture or cultural heritage some rock-cut sites are mentioned (Skal’nye monastyri, 1986: 107-120; Ansambluri monastice, 1985: 44-67). But, the first scientific work was done by two architectures at the beginning of 1980s, where they discussed the symbols attested on the walls of cells from Orheiul Vechi (Grosu and Vasilaki 1984: 61-69).

As a result of the collapse of USSR most of the churches and monasteries were reopened and restored, and the interest for religious studies or related to this area increased. During 1990s a number of academic events in Lvov, Ukraine, 1996 (Naukova Konferencija 1995), Chișinău, Republic of Moldova, 1997 (International Seminar 1997), Timișoara, Romania, 1998, Tbilisi, Georgia, 1998 (International seminar 1998) and Sofia, Bulgaria, 1999 (International Seminar: 1999) by discussing various aspects of rock-cut architecture and suggesting a number of possible solutions for research and preservation demonstrated the actuality and the importance of this topic. The Journal Sud-Est during 1990s published some papers on rock-cut monasteries from Romania and the Republic of Moldova. But, the number 4 (30) is fully dedicated to the 1997 conference and covers most of the presented papers at this academic event. The International Seminar of 1997 in Chisinau gave a positive impetus to launch studies on rock-cut architecture from Orheiul Vechi by Moldo-Ukrainian team. During 1998-2001 archaeological investigations, measurements and cartographic records were carried out both within the already known cells and monasteries and some newly discovered complexes. But, unfortunately the results of these investigations have not been published.

A. Dumbrăveanu discussed the state of cave monasteries (Japca, Saharna and Butuceni) and noted that the degradation of cave temples is a phenomenon caused by both natural and human conditions (Fig. 1). He notes that today’s monks’ attempts to protect and restore the caves spoil the originality of these monuments and lead to their destruction, because they do not meet the current methodology and techniques of protection and preservation of historical monuments (Dumbrăveanu: 1997, 84). So, during the past two decades, many studies have addressed the rock-cut sites from the Republic of Moldova and appeared in various works. But, most of them are very general and the complex work of this phenomenon is rather actual (Musteață 2005: 197-202; Ilvițchi 1999; Eșanu 2013; Xenofontov 2015).

3. ORIGINAL LANDSCAPE

Human evolution has always been closely linked to the natural factors. Therefore, in the historical research it is necessary to know the peculiarities of the geographical environment (landscape, hydrography, climate, vegetation, etc.) and their connections with the human factor. The landscape is determined by the geological structure of the region, the result of a process of sustainable development that influenced the formation of other elements of the environment (river, soils, flora and fauna, human settlements, economy etc.). The hydrography of the Republic of Moldova is made up of rivers, lakes of various types, groundwater and the Black Sea. Most rivers originate in the Carpathian Mountains and are collected and taken to the Black Sea and the Danube. Dniester is the longest river (1352 km) which is taken to the Black Sea through the Dniester Lyman. The second river, which actually makes the border between the Republic of Moldova and Romania, has the length of 967 km. The largest tributaries of the Dniester are Prut, Ikel, Bic and Botna.
Raut, a tributary of Dniester, played an important role in the development of human communities over the centuries (Fig. 1). Dniester and Raut are original by steep limestone cliffs and create a special landscape in some regions. The rock-cut sites are concentrated in the rocky banks of Dniester and Raut rivers. The limestone is a result of Sarmathian Sea bottom. The deposit of the chalk, scallops and other Sea creatures are seen on the rock structures. This type of rock is usually soft and easy to be excavated. The most important cave monasteries on the banks of Dniester are Japca, Saharna and Țipova (Fig. 1). In the middle part of Raut the river has steep banks of limestone where a series of rock-cut complexes were made and are well-known as – Orheiul Vechi hermitages or monasteries (Postică 2010: 12-31).

4. ROCK-CUT HERMITAGES AND MONASTERIES

Monasteries in the eastern Carpathian territories occur with the foundation of the medieval state of Moldova and the Orthodox Metropolitan since the second half of 14th century (Cereteu 2004: 23). According to the written sources, the first monasteries in the regions between Prut and Dniester were attested at the time of the ruler Alexander the Good (1400-1432). Some rock-cut cells and hermitages could be used earlier, but some well-organised rock-cut monasteries appeared during the 15th -16th cc. (Eșanu 2013: 35). The building of rock-cut monasteries in limestone banks of Dniester and Raut Rivers took place for several reasons. Firstly, for the security and limited access reasons. During the Middle Ages, the regions were often attacked by various powers, especially by Tartar hordes. Secondly, it reflected the early monasticism and relations with the Middle East model. Thirdly, because of the soft rock, the limestone was easy to be excavated.

Japca monastery is located on a terrace of the right bank of the Dniester (Fig. 1). According to some data, a monk Iezechiil built the church in the Holy Cross rock and a few cells at the end of the 17th c. The church has an oval porch, narthex and nave rectangular quadrangle, and a semi-circular altar (Fig. 2). Above the church, at a distance of 8.5m, there are four cells. In front of the church there is a terrace with the length of 31 m. In 1764, the monk Theodosius, comes from Deleni, Botoșani county, finds hermitage...
left, and start his rehabilitation, which by 1818 is recognized as a monastery. Only in 1825 a summer church was built, and between 1847 and 1849 – a winter church. In 1851-1853 the rock-cut church was restored too (Ghimpu 2000: 168-169; Eșanu 2013: 442-443; Xenofontov 2015: 54-55).

Țîpova monastery (hermitage Horodiște) is the most representative from the range of the cave complexes in the Republic of Moldova (Fig. 1). It is located on the right bank of the Dniester terrace in three levels, at a height of 90-100 m of water Dniester (Fig. 3). Although the town has been certified since 1495, the first document attesting the existence of the monastery is from November 13, 1699 - reflecting a situation of monks from Horodiște, receiving stolen bread (Ghimpu 2000: 174; Eșanu 2013: 428). In a land act of 1722 captain Ionita Uricul forwarded part of the village Horodiște to hetman Dumitrașcu Racoviță. The new landowner allows monks to dwell further on real estate. A similar document from November 1, 1755 confirming the right of the monks to use the land in exchange for an annual payment (Eșanu 2013: 429). The cave complex is composed of two parts - the old one and the new one (Fig. 3). Initially there was a monastery in the north of the monastery and the church dedicated to the Assumption. The old part is made up of 19 cells, refectory and the church carved into the rock at the same level, today the façade is mostly lost in most complexes (Fig. 4). The new part of the monastery, built in 1756, represents geometric cells organised in three levels. At the first level are outhouses, at level two - three cells and at third levels – church and six cells (Fig. 5). In front of the church is landscaped terrace with steps providing access outside. After the images of the 20th c. a terrace with a wooden guardrail was made. The church has three traditional compartments: narthex, nave and altar. The first two are separated by two massive stone pillars and altar is separated from the nave by stone iconostasis. The nave is vaulted. These structures in the rock are organised as a cells network, which communicate with each other (Taras and Anan’ina 1986: 108). The first abbot monk Athanasius is certified to Horodiște in 1769 and the monastic community information comes from 1809 when 10 certified hermitage creatures from Horodiște (Eșanu 2013: 430). By 1817 the community has reached 13 people. Great view valley bank, and vice versa, an extraordinary sight from the Dniester River to the shores, rocky cells and cave church. The new monastery represents another type of constructive and monastic organization, concentrated in a smaller area and multistage.

Fig.3. Țîpova. General view, 2014 (photo credit R. Cemârtan).
Orheiul Vechi is one of the most visited touristic places in Moldova (Fig. 1). Original landscape makes this place attractive for locals and for foreigners. Orheiul Vechi – is placed on a promontory, formed by the Raut river which is basically a canyon with high banks (Fig. 6). From geological point of view, this region is a part of the Lower Dniester, the plain terrace. In the micro-region Orheiul Vechi over 350 cave complexes have been attested, out of which about 100 dug caves cells and around 250 are karst/natural formations,
some of which are used by people. Orheiul Vechi cave complexes are concentrated on the north slope of
the promontory Butuceni and on the north slope of the right Raut terrace named Mașcăuți (Postică 2010:
68). Several documents from the 18th c. attested Orheiul Vechi or chief magistrate of Peștera town, which
formerly was called Movilova. Probably, village name comes from an impressive number of cells / caves
in the limestone cliffs of the river Raut. During the 20th c. investigations determined that caves/cells from
Orheiul Vechi are concentrated in six complexes, out of which two are monasteries – Bosie and Peștera,
and four - other groups of cells: Peștere, Chilior, Stânca Corbului and Holm (Postică 1998: 23). Peștere
Hermitages are placed at 20-30 m above the river and in the rock engravings 72 cells and 63 natural caves
are registered, some of which are documented traces. Chilior Hermitages (Rafael) are situated on the cliff
in front of the Butuceni church and represents 20 cells in five levels. Twenty-nine cells of the Hermitage
Stanca Corbului (Raven’s Shelf) are placed at 80-90 m above the Răut river. Holm-Stânca Apliniștilor (Hill-
Climber’s Shelf) represents cells in few levels, difficult to access, at an altitude of 80-100 m above the river.

**Monastery Bosie** represents a cave monastic complex situated at the altitude of circa 20-30 m
above the Raut waters (Fig. 7). The holy dwelling is composed of a church and 9 cells. The Church is
a relatively large room (11x4,5 m) with apses and an altar. Arched niches are designed for icons and/
or candles. There are two entrances in the northern part of the monastery. The porch is placed in front
on a limestone platform. On the church’s façade a few inscriptions have been attested in Slavonic and
Romanian languages (Fig. 8). The inscriptions were published and commented a few times during the 20th
first text is engraved:

СЕЙ МАНАСТИР РАБЪ БЖИЙ БОСИЙ ПЫРКАЛАБ ОРХЕОВ СЪВРЪШИ СЪ
ПОДРУЖИЕМ И ЧАДИ СВОИМИ В ЧЕС ГУ БУ ЗА ОТПУЩЕНIЕ ГРЕХОВ СВОИХ
СЕЛЕВЯСТР У ЛТ 7173 (1665). [This monastery was built by the slave of God Bosie,
chief magistrate of Orhei district, together with his wife and his children, to cherish God, to
forgive his sins. Selevestru, year 7173 (1665)].

Another inscription in Romanian language is preserved on the opposing part:

АЧЕСТУ ЗАПИС ЛАУ ФЪКУТЬ ВАСИЛЕ АНДЕЕСКУЛ ШИ КУ РЪЗМИРИЦЪ ЛЕКА
І(Н) ЗИЛЕЛЕ ЛУІ КОСТАТІН ВОД(А) КЪНДУ А(У) ЕРЪНАТ УКРАІНА І(Н) ИВАНЧЕ
ШИ АУ ФОСТЬ СТЕЦЪ ХАТМАН ЛА УКРАІНА ШИ НОІ А(МЕ)РНАТУ АТУНЧЕ
АІЧЕ ЛТО 7198 НОЕ (М) 20 (1689). [This inscription was done by Vasile Andeescul and
with Razmeritse Leka in the days of Constantin ruler when Ukrainians spent their Winter
in Ivancea led by Stetsi Hetman and we spent the same Winter here in the year 7198, 20
November (1689)].
According to the first inscription we could understand that the monastery was built in 1665 by donation of Bosie, chief magistrate of Orhei district and the second inscription confirms that monastery had already functioned by the year 1689. During the excavations a few years ago, we discovered a burial-ground on the terrace in front of the church. So, it is a very interesting case when the graves were cut in the rock of the monastery terrace.

Fig.7. Orheiul Vechi. Bosia Monastery general view (photo credit S. Musteata).

Fig.8. Orheiul Vechi. Bosia Monastery, entrance in church (photo credit S. Musteata).
Monastery Peștere is attested at the beginning of the 19th c. with Dositei abbot (Fig. 9). The monastery is about 60.0 m above the water Raut. The rock is placed on a stone cross. By 1816, the monastery had had five monks and three brothers (headed by Rafael hegumen). Due to a conflict with the landlord Matthew Donici, they moved to the hermitage of Suruceni. The Pestere monastery consists of a church and 12 cells. It has two entrances, one leading to the terrace and entrance to the church, and the second entering the area of hermitages. The steps from the side of the church entrance were damaged due to erosion or earthquakes which caused a rupture in the rock. The church has an area of 36 square meters, with nave, vaulted nave and altar 6x4 m, height varies between 2.6 and 3.5 m. In the wall behind the altar a diaconicum and recess were made. On the perimeter walls of the church a number of niches designed for icons were preserved. It has kept the altar table which is carved in stone. Monastery Pestere, differs from other cave complexes, because even in space carved a cell church and the church is passing into another room, where lies another 11 cells, separated by stone walls. Out of the church there is a door leading to a terrace and steps to evil, which were virtually destroyed. The terrace opens an exceptional landscape in the valley and towards the headland. At the beginning of the 19th century Monastery became parish of the village Butuceni. In 1821 local inhabitants built a tunnel from the village to the monastery church. They arranged a narthex from space designed for cells and left intact just one cell, next to the exit door onto the terrace. The traces of other cells are visible in the walls. During 1821-1822 there was built a belfry. Local inhabitants used the monastery church for local religious needs until 1946, when communist authorities ordered the closure of the monastery and the heritage (altar, icons) were plunged into Raut river.

Both monasteries are quite small and rather were some hermitages (Ghimpu: 2000, 137). Although many researchers date this rock-cut monastery back to the Middle Ages, since the 15th c., the first written mentioning is just from 1821. A lot of Christian signs and ancestral inscriptions are engraved inside the cells. The situation of most hermitages and cells is very bad, because of earthquakes, and especially as of the disastrous effects of erosion and human exploitation of the region (Fig. 10).
Saharna Monastery. The first written mention of the village Zăharna dates from 1495 (DRH, A, III, 319), but the hermitages date from the second half of the 18th c. The rock-cut complex was dug in the rocks near small Saharna river, a tributary of the Dniester - nice area with several waterfalls (Fig. 1). Hermitage Saharna (called Horodişte) is composed by a small church with a few cells, which rather was a chapel altar and nave, separated by iconostasis (5,3x2,5 m). Near the church a few cells were built on a terrace at the same level, which are today destroyed and only their traces, which suffered from erosion, are visible in the rock (Fig. 11). Although some historians consider this hermitage as one of the oldest in the Prut-Dniester area, the first written references are relatively late. Thus, in 1776 the monk Bartholomew comes to find an abandoned hermitage, and mends and creates a community. Because of this document, scholars are considering the old hermitage origins. In 1818 the construction of the stone (Summer) church began and in 1883 - the Winter church, which are parts of the new monastery and since that time the role of rock-cut complex decrease.

In addition to the rock-cut monasteries in the Republic of Moldova a number of other rock-cut cells that completes the picture of this phenomenon have been attested. Among them they can mention the cell from Cosăuţi, which is named by locals – Chalk monastery (Carp 2005: 386), Bichir Cave from Soroca (Ghimpu 2000: 144-162), Holercani-Marcăuți (Bâzgu, Sinhani 1997: 4, 30, 86-89), Molovata etc. For example, Molovata Hermitage is located in the rocky banks of the Dniester and is composed of two rooms. The church has an irregular shape, the nave square 3,7x3,8 m, deepens the cliff to 10.0 m. The cell has an area of 1,92x3,90 and 1,76 m height (Iviţchi 1999: 41).

Revocation or leaving cells, hermitages and monasteries was the result of several factors, both natural and anthropogenic cant. Some complexes were damaged in the earthquake, and the result could not be restored, repair costs were too high and we walk them becoming a threat to the monks. The human factor, holding the economic situation of the site or the monks’ relations with the owners of nearby landowners or communities.
5. CONCLUSIONS

The main problems when studying this topic are related to the date and chronology, type of monastic practices and architecture, the relations between local and foreign monastic centres, ethnic origins of monks, etc. Hence, there is not an easy solution of these research questions, especially because of the lack of written sources, lack of complex archaeological excavations, small number of historical comparative studies, etc.

In the most cases, all rock-cut hermitages, churches and monasteries try to reflect the earliest and original Holy Land and Judean Desert monasticism. The sites from the Republic of Moldova are not exception from this phenomenon. The building time of these complexes is not clearly established, but their existence can certainly be framed with the medieval state of Moldova (15-17 c.) and modern times (18-19 c.). In this context, it is particularly important to place the rock-cut sites from Moldova in their broader geographical context, which would mean an examination and presentation of the elements of such architecture from South-Eastern Europe starting from the Late Antiquity throughout the medieval period, when the Balkan peoples accepted the Christian religion.

Acknowledgements

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ABSTRACT
The Bandiagara Escarpment has been providing, for over two thousand years, a huge potential for cultural expression to the human societies inhabiting it. The uniqueness of human settlement in the Dogon Country stems from adapting local urban structures to the unusual environment, that is very steep rock cliffs stretching for tens of kilometres. Due to the extremely precious cultural values permanently embedded in the structure of the local environmental landscape, in 1989 it was entered onto the UNESCO World Heritage List. The official entry was made under the name of "Natural and Cultural Sanctuary of the Bandiagara Escarpment". The name underlines both the cultural input of the Dogon Country in the common global heritage and its natural environmental conditions which have had a great influence on the development and characteristics of the human culture. Spread of the settlement and influence of external factors for choosing those kind of inaccessible habitats, could be one of the main unsolved questions. There is no doubt that Bandiagara escarpments were being used by the local people, mostly as a defence places, quite often far from fields or hunting zones. Factors connected with defence were the primary incentive that drove the people of the Toloy, Tellem and Dogon cultures to adapt the cliffs of Bandiagara to their needs. Climate changes were also important the factor which determined social changes in the entire Dogon country. Another factor influencing the gradual transformation of the cultural landscape of the Bandiagara Escarpment is the increasing globalization.

Keywords
Africa, Bandiagara, Dogon, archaeology, paleoclimatology, globalization

1. INTRODUCTION
The Dogon country is located in the western part of the African continent, in the central part of today's Republic of Mali, and administratively it lies in the Mopti region. The name of the discussed area derives from the Dogon people, who have lived there since circa 14th century. Part of the Dogon ecumene lies outside of the protected area, however; in the south, Dogon settlements can be found even as far as northern parts of Burkina Faso. They are considered part of the Gur (Voltaic) cultural region (Baumann, Westermann 1957). Geographically, Dogon country lies in the area of the so-called Inner Niger arc, east of the Niger bend and the Inner Niger Delta in the vicinity of Mopti. The area inhabited by the Dogon people consists of several distinctive geological features. The Bandiagara Plateau stretches to the north-west; it is a massive, tectonically lifted rock plate, consisting of sandstone with parts covered by clay soil. The plate is slightly inclined on its NW-SE axis, which causes its northern and western parts to blend into other rock formations, whereas its eastern edge is raised relative to neighbouring plains, creating distinctive precipices, known as the Bandiagara Escarpment or the Cliffs of Bandiagara. Two plains, Seno and Gondo, stretch at the foot of these cliffs. Of note is also the Dyounde-Gandamia massif in the north-eastern part of the Dogon country. The rock cliffs of Bandiagara stretch along the SW-NE axis over a distance of approximately 150 km, with height of up to even 400 to 500 m above the Seno and...
Gondo plains. In some places the edges of the cliffs are eroded to such an extent that passages allowing communication were formed between the plains and the plateau. The cliff walls themselves are riddled with numerous caves and ledges. Rock debris formed due to erosion can be found beside the outer walls of the escarpment; in certain places, these debris can reach tens of meters in height. The climate in this area is typical for the Sahel zone, with primary division into the rainy (June to October) and dry seasons. The highest temperatures are recorded at the end of the dry season, when they can be as high as 40°C. The area's drainage system is based on periodic rivers appearing during the rainy season; there are no perennial rivers running through the Dogon country. The savannah surrounding the cliffs causes the flora of the region to be dominated by grasses, with singular tree enclaves, mostly baobabs - orô (*Adansonia digitata*) and acacias - singin (*Acacia senegalensis*). Natural conditions of the Bandiagara Escarpment had a decisive impact on the form and nature of human settlement developing here and directly contributed to the formation of the unique culture of the Dogon country (Buchalik 2011: 32-42; Łapott 2015: 93-96).

Due to this unique culture, permanently etched onto the form of the local landscape, in 1989 Bandiagara Escarpment was included in the UNESCO World Heritage List (ICOMOS 1989a, ICOMOS 1989b). The official entry was made under the title "Natural and Cultural Sanctuary of the Bandiagara Escarpment" (*Sanctuaire naturel et culturel de la falaise de Bandiagara*). This title highlights both the cultural contribution of the Dogon country to the common world heritage as well as its natural conditions, which profoundly affected the development and character of human culture. It is this interweaving of environmental influences and human culture that created the cultural landscape so characteristic for this region. It is therefore not surprising that the inclusion in the UNESCO list was made based on not one, but two criteria defined by UNESCO for the most valuable cultural and natural monuments in the world. Criterion V, which refers to historical heritage, states that for a place to be considered as needing special international protection it has to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change. Criterion VII, natural, in turn states that a place has to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance in order to be considered as needing special protection (UNESCO 1989).

2. CHARACTERISTIC OF SETTLEMENT IN THE BANDIAGARA ESCRAPMENT

2.1. First architectural structure - Toloy culture

The uniqueness of human settlement in the Bandiagara Escarpment stems from adapting local urban structures to the unusual environment, that is very steep rock cliffs stretching for tens of kilometres. The first society to leave architectural relics were the people of the Toloy culture. It is so far the least examined culture with enduring architectural remains. Several radiocarbon datings performed in the 1970s by a team of Dutch researchers indicate that the people of the Toloy culture inhabited the Cliffs of Bandiagara around 3rd/2nd century BCE (Bedaux 1972: 185; 1974: 17-19). It was the first human group to adapt the natural terrain for urban purposes. Unfortunately, it is impossible to reconstruct the complete settlement network which functioned in the Bandiagara Escarpment over 2 thousand years ago; relatively few architectural features of the Toloy culture remain, especially compared to what remains of the Tellem and Dogon cultures. This is due to the fact that the people of the Toloy culture built their abodes out of clay coils, placed spirally to create a structure resembling a cone, with a pointed roof (Bedaux 1972: 103-185). They were built in rock alcoves and caves, which protected them from adverse weather conditions and prevented their erosion. So far there are no known open sites of the Toloy culture. It is possible, however, that they actually existed, but the structures were destroyed by weather conditions or utterly devastated by later settlement. Nevertheless, considering the material from which they were built, the fact that they have endured for 2200 years should be regarded as extraordinary. Another factor influencing the lack of
knowledge concerning the settlement network of this archaeological unit is insufficient research; further thorough studies of Toloy settlement are clearly necessary. In the future, such analyses will undoubtedly uncover more information on the subject of how the discussed area was utilized at the turn of the eras.

2.2. Flying peoples - episode of the Tellem culture

The next permanent inhabitants of the Bandiagara Escarpment were the Tellem people. Their name comes from the Dogon language and roughly translated means "the people who were here before us". Unfortunately, in their records the Dogons did not leave the information on how these people called themselves (Buchalik 2011: 555-556). The first certain traces of Tellem settlement are from the 11th century CE (Bedaux, Lange 1983: 16-17). It was a period of social and political turmoil in Western Africa related to the fall of the Ghana Empire. Berber influences visible in the Tellem architecture from the period of initial phases of settlement in the Escarpment would confirm the reason for migration and at the same time indicate the direction of its point of origin (Bedaux, 1972: 165-166, 175). During the period of recolonization of the Escarpment at the beginning of the 2nd millennium a sudden climate breakdown also occurred: a very humid period suddenly shifted to a very dry period (Mayor et al. 2005: 29). Much like in the case of the Toloy culture, archaeological sites connected with the Tellem people are located in hard-to-reach rock alcoves and caves in the cliffs. However, the number of these settlement points discovered so far is immeasurably higher compared to the number of sites connected with the people preceding them. The Tellem constructed their buildings using banco bricks and coils (Bedaux, 1972: 103-185) (Fig. 1).

The way in which several hundred architectural complexes were built in such hard-to-reach places is remarkable. First, clay was acquired from the savannah surrounding the cliffs; it was then carried to the base of the caves. Such a heavy material was subsequently transported tens of meters upwards along the nearly vertical cliff walls. The scale of this undertaking is further reflected in the fact that the Tellem people were predominantly a hunter-gatherer economy. This did not permit a large food surplus, which could be used to cover high energy costs needed to organise these types of logistic endeavours. Archaeologists

Fig.1. Architecture of the Tellem culture (Buchalik 2011: 559).
inspecting several such sites in the 1960s and 1970s had to use mountaineering equipment and specially
designed technical structures (Bedaux 1972: 124). According to certain oral traditions of the Dogons,
building in such hard-to-reach places was possible because the Tellem people could fly (Lapott 2015: 87).
This myth shows that even contemporary inhabitants of the Bandiagara region are baffled by the structures
built in the alcoves and on the ledges of nearly vertical cliffs.

2.3. Dogons (14th - 19th century)

The Tellem culture had been developing for approximately 500 years. Its dawn came with the Dogon
migration to their current settlements. Initial waves of this migration reached the Cliffs of Bandiagara in
circa 14th century (Buchalik 2011: 568-571). To this day it is not clearly established whether the population
change was a gradual and fairly peaceful supplanting and partial assimilation of indigenous people or
whether the land was taken by force. It should be noted that the Dogons had a typical agrarian-based
 economy. With the climate changes occurring at that time causing an increase in the average annual
precipitation, this way of acquiring food was more efficient in the Bandiagara region. This may have
favoured the replacement of a hunter-gatherer population with an agrarian society (Bedaux 1972: 7-42;
 Mayor et al. 2005: 25-61).

The Dogons land of origin is thought to be located in the Mande country (Tymowski 1979: 30; Buchalik
2011: 550-552). The incentive to leave their original settlements can once again be indirectly ascribed to
climate changes which occurred in Eastern Africa. At that time, after several hundred years of stabilization,
the environment was becoming more and more humid (Mayor et al. 2005: 29,50). There were also
important changes in the political arena - the Mali Empire was gradually losing significance and a new
regional power, the Songhai Empire, was gaining strength (Tymowski 1979: 101-117).

Owing to numerous ethnological studies, the knowledge concerning the Dogon culture is far greater than
in the case of Toloy or Tellem cultures. The Bandiagara Escarpment, due to its geological characteristics,
can be easily adapted for defensive purposes. This was the direct reason for which the Dogons chose
this particular place as the final destination of their migration. Contrary to their predecessors, the majority
of Dogon settlements and architectural complexes were located not on high ledges or in caves but at the
foot of the cliff walls and in narrow ravines occasionally cutting through the edges of the cliffs (Huet 1994)
(Fig. 2). The villages at the foot of the cliffs were built on rock debris composed of stones of various sizes
which were separated from cliff walls through erosion. This caused the settlement to be raised relative
to the surrounding plains which, coupled with fortification, added to defensive advantages and allowed
for better observation of the surrounding area. Furthermore, fertile soil suitable for crop cultivation was
not occupied. The villages built in ravines were protected by stone walls stretched between rocks which
effectively cut the ravine from the open area. The area inside the village itself was organised in such a way
that low and narrow passages between individual crofts prevented mounted warriors from riding through.

Due to unique character of local geological conditions each village has its own individual model of
adapting to defensive conditions. Some settlements were placed in such a way that the terrain itself
prevented attackers from breaking in. For instance, Garmi, built on a high, broad ledge, was blocked by a
steep slope on one side, and by a tall rock on the other (Huet 1994: 28-29). Tabi, located on the isolated
Gandamia massif, could only be reached by a narrow path inclined at an angle of 60°, additionally blocked
by two walls, the holes in which (during the night blocked with large rocks) were no wider than 1 meter
(Kamian 2003: 53-54). Youga-Dogorou is, in turn, isolated from the outside world by steep stone walls
surrounding it on nearly every side (Huet 1994: 28-29). Some villages located in a more open area were
encircled by walls, for example Samari was surrounded by two rows of stone walls (Buchalik 2011: 441).
The urban structure developed by the Dogons over a period of five hundred years is strictly linked to the
defensive potential of the occupied terrain. The need for safety at the expense of a more comfortable
way of life had its origin in the turmoil which prevailed in Western Africa during the second half of the 2nd
millennium. It was a time when the region was politically strongly divided into many smaller countries competing with each other. Dogon territories suffered invasions by the Songhai, and then by the Fula and the Toucouleur, among others (Tymowski 1979: 204-240). Practically every neighbour was a threat to the society living by the cliffs. These invasions were raids to plunder and take slaves, and it is this kind of threat the defensive complexes had to withstand. The villages were adapted for fighting off a single, intensive, but short raid. There was, however, no need to adapt the urban structure for prolonged sieges.

An open question is the way how individual villages communicated with one another in case danger was approaching. On the exposed Sendo and Gondo plains the Dogons formed confederations of several smaller villages to defend against attackers. Two largest of such organizations are Guru, with an informal capital in Kiri, and Geje, whose centre was Sim (Martinelli 1995: 365-405). Those inhabiting the escarpment, on the other hand, were more politically fragmented, creating virtually no trans-regional communities. Nevertheless, all Dogons have a sense of unity and distinctness from other African peoples (Łapott 2011: 119-132). The cliffs stretching over a distance of 150 km in an almost straight line could be naturally predisposed for creating a trans-regional network in order to warn each other of approaching enemies. Given the fact that the Dogons chose to settle in the Bandiagara Escarpment precisely because of its defensive potential this sort of assumption would be highly probable. Unfortunately, archaeological research concerning the past of the Dogon settlement is not very advanced, especially in comparison to large-scale ethnological research. Therefore, studies focused on these issues will only develop along with a more systematic investigation of this area.

According to M. Griaule, the most prominent researcher dealing with the Dogon society, there is a theoretical ideal layout of a single village, which in its outline is supposed to resemble a human being, with specific residential zones corresponding to specific elements of the human body (Griaule 1948). In practice, however, each compact settlement is adapted to local terrain. Dogons built their structures out

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Fig.2. Archaeological site and situation of a settlement in the region of Sanga (after: Bedaux 1972: 114).
of both banco coils and pana bricks as well as locally available stone. Certain characteristic buildings (like toguna, men's houses, among others) are made out of organic materials, such as wood or millet straw. The so-called earthen architecture present in the Dogon country is characteristic for the entire region of the Niger arc (Kelm 2000; 2014: 27-62). Structures built using his technique have thermal insulating properties, which in local climate greatly increases comfort of living. Within a fairly consistent manner of style which characterises Dogon buildings there is a large variety in architectural forms. Within a single settlement buildings with various functions are discernible. In certain complexes the facades are embellished in a specific way, by geometrically arranged niches in the building's wall. This action is underpinned by mythological references. W. Żukowski, a Polish researcher, identified four main variants of houses, which in turn are divided into numerous subtypes constituting intermediary styles between the main types (Żukowski 1978).

2.4. Dogons (modern time)

When the Europeans came, the model of land-use changed considerably. With the French imposing colonial sovereignty on huge areas of Western Africa aggressive behaviour, common during previous periods, ceased. Stabilized political situation and a long-lasting period of relative peace meant that the inhabitants were not forced to care as much about safety. In time, settlements located in the most hard-to-reach places were abandoned. The effort which in such places had to be put into acquiring food, or even water, was unprofitable during a long-lasting period of stability. Hence since the 20th century the Dogons have been moving away from hard-to-reach peaks to more fertile land. This behaviour somewhat confirms that the key factor driving these people to settle in the Bandiagara Escarpment was its defensive potential. A human who pursues an agrarian-based way of life and who has the opportunity to settle in an area where access to fields and pastures is not hindered in any way will, under optimal circumstances and with a sense of safety, choose exactly that model of land-use (Przybyła 2014). Additional energy cost of building appropriate structures in a hard-to-reach terrain and reaching production sites needs to be greatly justified. In a situation of comfort and safe existence every such cost is unnecessary and so humans do not attempt to settle in such ecological niches. However, when there is a sense of danger, additional calories spent towards utilizing a seemingly adverse habitat pay off as a greater degree of stability in the group’s life. The process of abandoning the refuge areas which are difficult to utilize in favour of new, more attractive areas as dangers pass can be seen in the very changes taking place in the Dogon country (Rak, Franczyk 2015: 105-108).

As the European civilization became more widespread, traditional Dogon building also changed. Traditional architectural complexes built out of banco require conservation and renovation from time to time due to earthen material being washed out; this process is particularly strong during the rainy season. Nowadays, cement is added to a new layer of banco plaster, which fills the area washed out earlier. Despite the fact that buildings conserved in such a way are less susceptible to weather conditions, the change in colouration causes them to stand out in the urban tissue of a traditional compact settlement. Structures built using earthen material blend really well into the surroundings due to their brown colour. Buildings in whose construction cement was used are steel-grey, which means that the village is visible from afar. During a period of turmoil, when the settlement should blend into the landscape as much as possible, this would gravely endanger the inhabitants. Nowadays, when camouflage plays almost no part whatsoever, this sort of behaviour, while not bringing about imminent danger, nevertheless leads to disintegration of the region’s traditional cultural tissue. Another problem connected with lack of endurance of traditional buildings is a gradual destruction of houses and granaries in recently abandoned villages. Since there is no one to renovate them, and they are not easily accessible, they are slowly disappearing (Buchalik 2011: 470-476; Lapott 2015: 327-372). Much older structures built by Toloy or Tellem peoples endured until today only because they were placed in caves and rock alcoves, where they were protected
from being directly affected by weather conditions. This contributes to considerations on whether similar open settlements had existed in those days, but were destroyed by erosion or newer structures built by incoming successors. Further advances in archaeological research will enable potential discoveries of such open sites.

Yet another factor influencing the gradual transformation of the cultural landscape of the Bandiagara Escarpment is the spread of stone slate buildings. Stone buildings increasingly supplant traditional earthen architecture. This is in large part due to a boom in tourist traffic: services for visitors necessitate creating an adequate infrastructure, which often does not harmonize with local tradition (Łapott 2001: 119-132). The paradox is that visitors come here to see a unique - on a world scale - cultural tradition blending into spectacular natural landscape. Yet an uncontrolled spread of these types of invasive architectural elements will inevitably lead to decline of the local folklore, which is Dogon country's main asset, and consequently to a decrease in tourist traffic to this area. Similarly destructive with regard to preservation of traditional cultural heritage is using other modern means of construction such as fired bricks, concrete structures or even construction elements made out of corrugated iron. Dogons were highly proficient in erecting earthen structures. The building traditions passed and perfected from generation to generation allowed to create the most optimal techniques, adapted to local climate and geological conditions. In the past there was no division to craftsmen who specialized in construction; every grown man was prepared to learn how to build houses, granaries and crofts. Nowadays, however, Dogons have trouble with outside techniques, creating structures which often do not follow even the basic principles of modern construction (Buchalik 2011: 473-47; Łapott 2011: 119-132).

3. CONCLUSIONS

The Bandiagara Escarpment has, for over two thousand years, been providing a huge potential for cultural expression to the human societies inhabiting it. It is an unwelcoming terrain, difficult to traverse, with problematic access to arable land or even drinking water. These inconveniences are offset by its highly defensive character, making it a perfect refuge in times of political and social turmoil. According to A. Maslow's hierarchy of needs, satisfying the urge to feel safe is one of the most basic needs, right after purely physiological ones (Maslov 1943: 370-396). In B. Malinowski's theory of culture, safety is one of the seven basic needs; the corresponding cultural imperative is one of the pillars of human culture (Malinowski 1939: 942). Factors connected with defence were the primary incentive that drove the people of the Toloy, Tellem and Dogon cultures to adapt the cliffs of Bandiagara to their needs. These societies adapted urban structures and architectural patterns present in the entire Gur (Voltaic) cultural region strictly to the needs related to settling on the new terrain, thus forming unique cultural patterns.

Climate changes were presumably the factor which determined social changes in the entire Niger Arc area. It should be noted that the climate zones in Africa change relative to latitude. The Dogon country, as well as the entire region, are located on the border between Sahel and a savannah; therefore, even the slightest climate swings cause profound alterations to the fauna and flora. This forces local peoples to react and abandon the status quo. Owing to the efforts of paleoclimatologists, a climate curve of the Dogon country was created (Fig. 3). It shows that practically all cultural changes which occurred over the last three thousand years correlate with changes in climate (Mayor et al. 2005).

Cliff settlements are of course not exclusive to Western Africa. They can be found in various parts of the world, for example Anasazi Indians created cliff settlements in the Mesa Verde region from the end of the 12th until the 14th century. Despite the distance between the two regions, similar cultural patterns can be observed in both. The reason for abandoning Pueblo culture open settlements and retreating to defensive positions were climate changes (Palonka 2011). The severe drought they brought caused social turmoil, which forced local societies to find refuges and places where the threat posed by attackers was
reduced. Under these new circumstances, the Anasazi Indians developed a cultural model (based on their cultural patterns to date) which corresponded to the challenges presented to them by the new habitat. This cultural convergence indicates that this type of landscape favours utilization during difficult times, when additional energy and resources necessary to utilize it pay off as increased safety (Rak, Franczyk 2015: 85-111).

Changes taking place as a result of increasing globalization naturally affected the Dogon country as well. Increasing outside cultural influences gravely endanger the continued existence of this cultural heritage (unique on a world scale). Taking into account the problems presented earlier which the Dogons face in the modern, quickly changing world, it is necessary to work out such models of conduct which would balance development in such a way that it would be carried out with respect towards the cultural heritage (Rak et al. 2015: 179-192). Archaeologists and other researchers are on one hand responsible for preserving, in general public interest, as big a part of common heritage as possible, but on the other - they cannot oppose economic development, which is also in general public interest. Solutions are needed which would allow the current inhabitants of the cliffs to benefit from the changes, while simultaneously preserving this undoubtedly unique place on the world map, this common heritage of humanity as a whole, for future generations.
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HEALING NATURE. SOME OBSERVATIONS REGARDING THE ROLE OF LANDSCAPE AS A SETTING FOR HEALING SPAS IN ROMAN THRACE

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ABSTRACT
Ancient medicine recognized the importance of nature for maintaining and restoring health. Its effect on the physical well-being was a subject often undertaken by doctors in medical treatises, the earliest and most famous of which is “On Airs, Waters, and Places”, one of the texts in the Hippocratic corpus. Healing spas were an important part of treatment of diseases in ancient Greece and particularly in ancient Rome. Roman spas were focused on the natural resources, e.g. mineral water. In Italy they were usually founded on place with a view of water or a spectacular view, however the most important criteria seems to have been the presence of mineral water springs. The main goal of the research here presented is to analyze briefly three case studies of spas in Roman Thrace and look for a connection between the information from the “On airs, waters and places”; the features of the landscape surrounding Italian spas and the presented examples of spas in Thrace. Such an analysis proves that in spite of the few presented examples, it is possible to observe some patterns especially regarding the geographical position and climate of spas in the discussed region. However, the small number of case studies cannot give a definitive answer as to the overall policy of foundation of spas in Thrace.

Keywords
landscape, nature, healing spa, Romans, Thrace

1. INTRODUCTION
Nature was the main resource for healing in the ancient world. It is only understandable that in the absence of chemically produced medicines, mainly herbs and natural goods were used in order to maintain health or heal the sick. However, the ancients were aware that nature’s impact on health was not limited only to the use of herbal remedies. In ancient Greece healing centers like Epidauros emerged, where apart from the believed healing powers of the god Asklepios, nature surrounding the sanctuary played a key role in improving the patient’s mental and physical state. The present article concentrates on healing spas – establishments, where the healing qualities of mineral water were used in order to improve health.

1.1. Remarks / Methodology
The research here presented aims at establishing to what extent the locations of healing spas in Roman Thrace fit into the overall concept of ancient medicine, therefore the present paper consists of two parts. The first one concentrates on the requirements regarding the landscape surrounding a healing site that can be found in ancient literary sources. The second part looks at chosen case studies of individual healing settlements in Roman Thrace, focusing on the topographic features of the terrain, where they are situated
and on the natural resources and climate in their vicinity. The comparison of those two types of evidence will allow for a more complete view on the role of landscape in healing settlements in Roman Thrace.

The observations on the landscape features of the settlements, included in the present paper were made on the basis of The Digital Map of the Roman empire(1). The map is a result of Pelagios - a collective of projects, which studies ancient geography and aims at creating a complete and detailed map of the Roman empire (Pelagios-project.blogspot.com 2016). The Digital map allows for a zoom up to the scale 1:500,000, therefore in some occasions the ArcGIS World Topographic Map, which allows for a closer zoom was used(2).

The setting and surroundings of spas have not been thus far a subject of thorough research. Though research has been conducted, that focused on landscape in the Roman world, it does not include spas as a specific case study (Spencer 2010). One of the few references on the topic can be found in PhD dissertation of T. Allen (Allen 1998), where the author only briefly comments on the topic, however her observations are among the very few of the kind in scientific literature.

Roman province of Thrace was founded in 46 AD after the annex of the Odrysian kingdom by the Romans. At its creation the province encompassed the territories of the former Odrysian kingdom between the Hemus mountain (modern Stara Planina(3)) and the Aegean as well as parts of Macedonia and some territories north of the mountain. However, some territorial changes occurred in the beginning of the 2nd century and the lands north of the Hemus became part of the neighboring province Moesia Inferior (Lower Moesia). Furthermore under Diocletian’s territorial reform in the end of the 3rd and the beginning of the 4th century Thrace was divided into four smaller provinces: Thracia, Haemimontus, Rhodope and Europa. The dynamic change of borders of the province make it necessary to establish some stable borders for the goals of the present research. For this purpose the author choses the period right before Diocletian’s reform, first, because this event draws a thick line in the history of the said province and secondly because at the time all of the discussed settlements were already in existance.

As a result of the limited volume of the present paper only three ancient healing settlements from the territory of Roman Thrace will be presented here, namely Germanea, Aquae Calidae and Diocletianopolis (Fig. 1). Moreover only the basic features of the landscape surrounding those spas will be presented, once again because of the constrained size of this work.

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Fig.1. Map of Thrace and the place of the discussed settlements (after: Pelagios-project.blogspot.com, 2016).
Finally, the research presented in this paper is in its initial stages, therefore the results here presented are only preliminary. Furthermore the methodology is constantly developing with the acquisition of more information and upon facing new and more challenging situations. The author will be grateful for any remarks and opinions of the reader.

2. CONTENTS

Awareness of the relationship between the environment and human health is definitively not a modern invention. It seems to have been an important part of the Hippocratic teachings and appears in some of the texts of the Corpus Hippocraticum, a compendium of treatises written by Hippocrates and his disciples, that was first edited in the 2nd century BC and later used as a basic teaching material for medics in the Greco-Roman world. In the Corpus nature is usually seen as a reason for both physical diseases as well as mental states and personality treats (Nutton 2004: 75-76). The latter observation is of crucial importance and shows both the need of the ancients to explain existing differences between people as well as the relations between the human and the environment, that surrounds him.

One of the best examples in ancient literature of the awareness of the relationship between health and the environment, understood as the sum of natural resources in a particular area or settlement, can be found in one of the treatises of the Corpus Hippocraticum – On Airs, Waters and Places. The text was included in the first two editions of the Corpus, which may indicate the widespread interest in the discussed problems. Moreover, being part of this canonical medical collection, it reached most of the medical practitioners, educated in this tradition. The treatise in question is dated to the last quarter of 5th century BC and is attributed by many to Hippocrates (460-377 BC) himself (Świder 2014a: 7). The author explores different aspects of disease and its contraction, as a result the treatise can be described as having pathogenic and physiological character (Świder 2014a: 7).

The text uses advanced medical terminology, so it can be concluded that it was directed at other contemporary physicians and not to the general reader. It gives advices related to visiting a new place, that is why many scholars believe that it was aimed specifically at travelling doctors, since physicians often travelled in order to gain knowledge and experience (Świder 2014b: 45).

In the very beginning of the text the author emphasizes the importance of the surroundings to health and advises the reader to pay attention to things such as the orientation of the settlement, that he visits, the quality of the water and soil as well as the winds typical for certain areas (Hp. Aer. I). Furthermore the author argues that observation of the nature and the ability to read its signs can help in preventing sickness and also in avoiding mistakes resulting from the poor knowledge of the surrounding environment (Hp. Aer. II).

Further on he analyzes the effect of different environmental factors on both human body and character. Though the provided explanations may seem unreasonable to us today, they were in accordance with its contemporary ideas of health and medicine. Though some of the ideas, presented in the text, seem strange, ungrounded and even funny to us, they need to be taken into account, since modern society seems to have gone from one extreme to the other and has at large stopped considering environmental factors and their effect on health. The use of mineral water for healing was not popular in the Greek medical tradition, as a result the specific type of settlements discussed in this paper, namely healing spas, were a rarity. However using mineral baths for healing was a common method in traditional Roman medicine, thus together with the Roman expansion spas became more popular.

Undoubtedly the principal condition for the emergence of a spa were mineral springs. Roman healing tradition used both cold and warm water for healing. Moreover in some texts references to the chemical composition of the water can be found and the effect of specific chemical elements on particular diseases(4). This comes to demonstrate quite advanced knowledge on the subject of spa healing and the usage of mineral water for curative procedures.
Amongst the best studied areas, where Roman spas can be found, is Italy. The establishments were studied by T. Allen (1998). The author concentrates on the functional and architectural features of spas in Italy, but still provides very interesting data regarding other aspects of those settlements. For the present study particularly one fragment of this research is important, namely the one examining the surroundings and setting of spas.

Allen notes that most healing settlements in Italy were situated in a place with a view of a water basin, quite often – the sea (Allen 1998: 48-50). She considers that the reason for this is the cool climate, provided by the sea, which would cause the place to be considered more healthy. Clearly the view of the sea is a condition that cannot be fulfilled by most healing settlements in Thrace due to geographical reasons – in most cases the sea is simply too far away from the mineral springs, whose water was used for healing.

Allen suggests that the view was also taken into consideration when choosing a place for a spa (1998: 48-50). In most cases it was a spectacular view, which could take the breath away and would be extremely beautiful or attractive at the least. In others for example Allen, however, notes that also there are spas, whose surroundings did not fit the above mentioned criteria. She suggests that in these cases the only element, taken into consideration, were the mineral springs and the need to use them (1998: 50).

The above observations on the surrounding of spas in Italy shows that Romans were not so particular regarding the setting of their healing settlements, the most important element were the mineral springs and easy access to them, other additional landscape features were also welcome, however they were not obligatory for the establishing of a spa. It also demonstrates the ability of Romans to adapt to the environmental features.

It needs to be noted that Allen’s observations concern spas in Italy only. The difference in the landscape features between Italy and Thrace is obvious. Most notably Italy is a peninsula, and a very narrow one at that, which allows for an easy view of the sea, an element mentioned by Allen. In Thrace, however, only a narrow strip of land has access to the Black sea, which means that only few spas could actually fulfil this criteria. Therefore the observations presented below take into consideration Allen’s observations, however the difference in the natural conditions should be remarked upon.

2.1. Germanea

The settlement near modern day Sapareva banya was first discovered in 1947 in the eastern part of the territory of the Roman city of Pautalia (present day Kyustendil). During waterworks related to the water supply network, votive plaques with images of Asclepius and other healing divinities like the Three nymphs and Hygeia were discovered in the trenches as well as coins, some of which were struck in Pautalia itself (Katsarova 2005: 24). The name of the ancient settlement is not preserved in any epigraphic sources, found on the site itself, however many scholars identify it with Germanea (called by some also Germania). Germanea was famous for being the birthplace of Velizarius, the famous commander of Justinian the Great. This hypothesis of the identification of the site near Sapareva banya with Germanea was first formulated by Tomashek in the 19th century, he believed that the etymology of the word is Thracian and means “hot springs” (Ivanov 1957: 229-231). Thracian origin of the name suggests that the settlement was founded in the Iron Age at the latest, however no data has come to light thus far that could undoubtedly confirm this information. The settlement is mentioned in written sources throughout late Antiquity and at the time of Justinian, however there is little information as to its later fate (Ivanov 1957: 230). The mineral springs, however, continued to be popular and were during the Ottoman rule in Bulgaria (1396-1878), when a Turkish bath was built, presently a modern bath stands in its place (Zavodata.com 2016).

The area very rich in healthful water. Firstly, there is cold fresh water from the mountain springs of Rila mountain (ancient Dounax), there is mineral water springs as well, whose waters attract visitors to this day, making Sapareva Banya a popular spa resort. Furthermore, the only hot water gazer on the
Balkan peninsula erupted here in 1957. The mineral water is the hottest in the Balkans at about 103°C, it contains high quantities of fluorine and hydrogen sulfide and is used in healing of the upper respiratory tract, peripheral nervous system, bones, joints and skin (Zavodata.com 2016).

Ancient Germanea is situated at around 700 m above sea level (Fig. 2). The valley, in which the ancient settlement was situated (Ivanov 1957: 230), is formed between the slopes of Rila mountain, that rise steeply up to 1100 m to the north and 2400 m to the south, creating a spectacular view. Thanks to the settlement being sheltered between the high slopes of the mountain the climate is mild, with average temperature in January of about 0°C, and about 22°C in July (Saparevabanya.bg 2016).

2.2. Aquae Calidae

Aquae Calidae (Fig. 3) is one of the few Roman spas in Thrace situated close to the Black Sea, at only about 10 km from the coast. The ancient settlement was established at about 100 m above sea level, to the north the site is surrounded by the low south hills of the East Stara planina mountain range, which rise to as much as 400 m above sea level in their highest parts.

The remains of Aquae Calidae are located in the heart of the present spa called Burgaski mineralni bani and was intensively used throughout Antiquity, the Middle Ages as well as in the Ottoman period. The Roman name of the site is preserved mainly in itineraries, i.e. Tabula Peutingeriana (Fig. 4), the Byzantine name of the settlement Thermopolis is mentioned by Procopius of Caesarea in the 6th century.

First archaeological materials from the site were recovered in 1910 during the construction of the new catchment of the mineral spring, however little archaeological documentation has survived and most of the remains were destroyed. Further excavations were conducted at the site in the 1930s, amongst the
Fig. 3. Topographical map of *Aquae Calidae* and its surroundings (after: Pelagios-project.blogspot.com, 2016).

Fig. 4. Fragment of *Tabula Peutingeriana*, showing *Aquae Calidae* (after: Pelagios-project.blogspot.com, 2016).
discoveries were two bathing basins as well as numerous coins. In the recent years excavations were conducted in the Thracian sanctuary situated on a small hill about 400 m to the north-east of the spring (Kiachkina, Karayotov 1997: 125).

The Latin name of the spa means “warm waters” or “warm springs”, this was a name commonly given by Romans to new founded spa establishments throughout the empire, *Aquae Calidae* is also the only known Thracian spa to fit into this terminology. The later Byzantine name is also related to the warm springs, which were obviously amongst the main features of the site. At first sight the undoubtedly Roman name of the city could point to it being founded by the Romans, upon their arrival and settlement in the region in the 1st century AD. Establishing the exact date of the construction of the Roman spa has been an object of dispute between scholars and dates from around 60 AD to about 70 AD have been proposed (Paunov 2015: 250)

Archaeological excavations, however, have yielded much earlier finds, which suggest that even though the baths were constructed by the Romans, the springs were a place of healing and worship for the Thracians as early as the 5th century BC, however the Thracian name of the springs is unknown (Paunov 2015: 249). In the ancient times it was common to throw a coin in a spring as a sign of gratitude for being healed, therefore amongst the most important sources of information for this is the numismatic evidence, discovered at the sight of the mineral springs. Coins recovered during the 1910 excavations together with some new findings from the recent years show the steady rise of interest in the spring in the 4th century BC, however most numerous are the coins from the 1st century AD, issues of the Julio-Claudian dynasty and the Late Thracian kings. Paunov also proves that the visitors of the springs were not limited to the Roman population and there were locals amongst them as well (Paunov 2015: 249-250).

The site is located in a relatively flat area which offers little in the means of spectacular views. It does, however, fulfil the criterion of fresh air, noted in some ancient medical texts, since its position away from high mountains allowed the winds to blow freely and secured the constant flow of fresh air. Some scholars believe that the key to its success lies above all in its strategic position on one of the main crossroads leading to the Black Sea coast (Kiachkina, Karayotov 1997: 125).

As a result of the close proximity to the sea, the humidity is moderate, but still higher than in other regions of the country, around 77% (Med-spa.kitt.bg, 2016a). The influence of the sea on the local climate provokes a mild winter, which could have been considered as an advantage. However, partly due to the lack of high mountains in the area and the flat terrain, the summer is hot.

### 2.3. Diocletianopolis

The last of the healing spas to be discussed in the present paper is *Diocletianopolis*, modern-day Hisar in Plovdiv district, Bulgaria. The city bears its name from the Roman emperor Diocletian (245–311 AD), who was healed by the water from the mineral springs in the area in the beginning of the 4th century. It is, however, widely believed that an earlier settlement, whose name is unknown, existed on this place (Madjarov 1993: 10-12), though it is difficult to establish whether the earlier city was a spa. The healing qualities of the water ensure that it is in high demand even today and the present-day city of Hisar is amongst the most popular spas in Bulgaria. This creates some difficulties in for the archaeologists researching the sight, since the remains of *Diocletianopolis* lie in the most part under the modern city, which makes large scale archaeological excavations difficult, or even impossible. Furthermore, the city continued its existence into Late Antiquity and the Middle Ages, thus the Roman strata were at some places compromised or destroyed by later building activity (Fig. 5).

The ancient settlement was situated in a valley at approximately 300 m above sea level, it is surrounded by the ridges of the Hemus mountain (modern Stara planina), which reach about 500 m in height to the northwest and up to 1000 m to the northwest, to the south spreads the vast fertile lands of the Upper Thracian Plain. The climate is mild, thanks to the surrounding ridges and Hemus mountain, which stop
cold winds coming from the north. Thanks to that the winter is mild, the summer is long, however not too hot with an average temperature around 22ºC (Med-spa.kittbg.com, 2016b). The area is rich in water springs, in the city and its surroundings there are 22 thermal mineral springs with low mineralization, which are presently used for treatment of renal and urological, biliary, gastrointestinal, liver diseases of the musculoskeletal system, as well as for drinking.

Analysis of the landscape features of the sight make it clear why the place was so attractive for the Romans. It fulfils most of the conditions for a healthful site outlined in the “On Airs, Waters and Places”, it is airy, with multiple springs providing fresh water and fertile land surrounding the settlement. Moreover, the mild climate allowed for comfortable living in summer, as well as in winter.

The setting of Diocletianopolis only loosely fits the criteria outlined by Allen. It is surrounded by mountain ridges, however they are not too high and because of the already mentioned geographical features of Thrace, there is no view of the sea. However, there is also or other big water basin in the surrounding of the settlement. Thus it seems that in this case the Romans were mostly interested in the mineral springs, however the overall healthfulness of the site was enough for founding a settlement in this place.

3. CONCLUSIONS

Balneotherapy was amongst the popular ways of healing in the Roman empire, which spread from Italy to the provinces. The results of the study here presented, though preliminary, allow for some interesting observations regarding the way Romans chose places for their healing settlements. Though only a few of them were presented here, it seems that the main criteria was the presence of mineral springs with
medicinal properties. On the basis of the dew presented case studies it can be observed that generally places with mild climate were chosen. Two of the three presented settlements were situated in a valley, thus it is tempting to conclude, that Romans preferred such natural conditions. However, it needs to be taken into consideration, that this may be predetermined by the fact that thermal mineral springs are often found in the mountains and in valleys. The rightness of such a conclusion can be proven only by further research, that will analyze a larger number of sites as well as more detailed information regarding each of them. Furthermore, other ancient medical texts need to be considered in order to get a more complete picture of the practice and theory of the relationship between landscape and health in the context of Roman spas in ancient Thrace.

NOTES
[3]  The transliteration of the Bulgarian geographical names, mentioned in the text, was conducted according to the rules for Romanization of Bulgarian, recommended by the United Nations, available at http://www.eki.ee/wgrs/rom1_bg.pdf
[4]  Summary of the most important observations of Romans regarding the chemical composition of mineral water and its curative effects can be found in Allen 1998: 25-34.

ABBREVIATIONS

BIBLIOGRAPHY
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GREEK AND ROMAN IMPACT ON THE ENVIRONMENT.
CASE STUDY: AKRAI/ACRAE IN SOUTH-EASTERN SICILY

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ABSTRACT

Sicily has always been a perfect place for human activities, owing to its great position and abundance of fertile lands. This island, which is the largest in the Mediterranean, remained for a long time a target for people in search of a new place to live, new markets for buying and selling goods, and additional ‘breathing space’. As an aftereffect, different waves of colonization of new territories followed. First, by the Phoenicians succeeded by the Greeks, who conquered and dominated the Sicels, thus obtaining access to lush lands for many centuries. When the greater part of Sicily turned into a possession of the Romans in 241 BC and the whole island in 212 BC, new owners had no particular vision of how to subdue and cultivate the island. Forming the first province proved difficult. But very fast the Romans were managed to regulate the locals and landscape, which both began to work for them. All these peoples had impact on the environment, but the local landscape also had played a role in the development of human communities here. The Greeks as later Romans quickly began to consume the natural resources, e.g. forests to produce charcoal, to obtain lumber, for the military and economic activities, and was cut to create accessible agriculture area and grazing lands.

This paper will discuss individual area of the island as case studies of human impact on the local environment and furthermore the local landscape as a foundation for a system of settlement, based on the available data from recent studies on the ancient town of Akrai/Acrae, located in the interior of south-eastern Sicily, atop of a naturally fortified plateau in the Hyblaean Mountains; the town, founded as a Greek colony in 664/663 BC, which grew also as a Roman and Byzantine centre till the middle of the 7th century AD.

Keywords

Greek colony, Roman town, Sicily, ancient environment, agriculture, nutrition

1. INTRODUCTION

Fernand Braudel (1902-1985), one of the most prominent historians of the 20th century, once wrote: ‘We are too inclined to think of Mediterranean life as la dolce vita, effortlessly easy. But we are following the charms of the landscape to deceive us. Arable land is scarce there, while arid and infertile mountains are everywhere present (…). Rainfall is unevenly distributed: plentiful when the vegetation is hibernating in winter, it disappears just when plant growth needs it. (…) Human labour is not relieved by the climate: all the heavy work has always had to be done when the summer heat is at its fiercest, and the resulting harvest crop is all too often meager’ (Braudel 2001: 77). This is why here the human relationship with the environment are worthy of mention.

One of the components of that Mediterranean mosaic is Sicily, the largest of its islands, located in the central part of the Mediterranean Sea and to the south-east from the Apennine Peninsula, thus being a natural, though somewhat ‘dramatically’ separated, extension of ‘the boot of Italy’. Due to its central position, it has been occupied by many populations throughout centuries and become a melting pot of civilization: a true riddle for an archeologist, given its multicultural and multilayered settlement, numerous archaeological artifacts, and equivocal stratigraphic contexts. The legacy of the island is vastly diversified.
as far as culture and customs are concerned, since it has been created by the tribes of Elymians, Sicans, Sicels, as well as the Greeks, Carthaginians, Romans, Byzantines, Arabs, Normans, Angevins and Aragons of Spain, and recently by the British and Americans. All these cultures left many imprints on Sicily: buildings, customs, artifacts. This intensive activity impacted also the local landscape and natural environment. But major changes begun together with an inflow of waves of settlers through the usually called ‘Greek colonization’, and later through inflow of Roman economic model.

Initially, incomers from Hellas were establishing towns by the sea (e.g. Naxos, Syracuse, Catania), but soon land hunger and craving for dominance pushed them more inland, where they started to wrestle the interior from native peoples (the Sicels and Sicans westward). The Greeks marginalized the local cultures in no time by introducing their own settlement model as well as cultural and economic patterns. Such territorial and economic expansion certainly caused numerous armed conflicts (e.g. between Sicilian poleis and Carthage likewise with Athens), which culminated as the Punic Wars (the first war - 264-241 BC; the second - 218-201 BC; the third - 149-146 BC). In the aftermath of the first Punic War, the Romans seized the western and central parts of Sicily, whereas during the second one they captured the south-eastern section (Goldsworthy 2007).

Thusly, a phase of intensified exploitation of island’s natural resources and slow, but persistent degradation of the habitat was started by the Greeks in the 8th century BC and continued by the Romans after 212 BC. For Rome, Sicily was not only a repository of taxes, but like for the Greeks - also of agricultural produce and natural resources. The flow of goods was fostered by excellent river transportation and well-developed sea ports (Wilson 1990: 6, 174). It is clear that the landscape and climate of Sicily was always changing, but the intensity of these changes largely depend on the Greek and Roman existences there.

2. THEORETICAL FRAMEWORK

Reconstruction of ancient landscapes is not an easy task. Simple generalizations flatten such a broad and complex matter. In order to reconstruct environment and create image in which an ancient town operated, one has to combine different scientific sources and methods; it needs to be an interdisciplinary approach. A foundation for that is laid by archaeological artifacts gathered through excavations and surveys, including animal bones analyses and archeobotanical examinations. Afterwards, results of studies on geology and topography of the area should be consulted. The data collected this way regarding the environment prior to the arrival of the Greeks and Romans and after that should then be juxtaposed, thus enabling a comparison of the degree of environmental exploitation. The geological and topographical data for the Hyblaean Mountains and the vicinity of Akrai were elaborated by J. C. Bousquet and G. Lanzafame (2004) and F. Lenten and S. Carbone (2014).

To investigate how the Greeks and Romans interacted with the environment I try to follow the some ancient written sources, osteological and botanical data, and the archaeological data, obtained while the archaeological investigation in Akrai/Acrae, as a case study (Chowaniec 2015a; 2015b). For example during the archaeological excavations between 2011-2015, bountiful faunal remains were discovered. The animal bones came from different stratigraphic levels: the original occupation levels (Greek-early Roman), leveling layers filled (late 4th century AD) with heavily mixed heterogeneous archaeological material, and the occupation layer formed when the area was re-adopted (4th-6th century AD). Only the bones collected from the original occupation and reused strata provide a possibility to follow the exploitation of the habitat by the people who occupied this area. Others do not give a clear picture. The archaeo-zoological examination was performed in detail according to standard rules and procedures by A. Gręzak from Institute of Archaeology University of Warsaw and Prof. Teresa Tomek from the Institute of Systematics and Evolution of Animals Polish Academy of Science in Cracow (Gręzak 2015). In addition, botanical data are also included. The botanical remains were obtained while the precise sampling, based on collecting
dry soil from various archaeological strata, sieving and flotation, performed over the last two seasons in Akrai. And this all permits to analyze not only the changes in diet of inhabitants of town, but also allows to track, in the successive periods covering almost 1500 years of functioning the town, human impact to the natural environment, which Akrai existed in.

3. CONTENTS

When the Greeks were coming to the island in the thirties of 8th century BC in their quest for soil and familiar landscapes, they settled, tentatively at first, in the eastern part of it, while leaving the western edges to their future foes - the Phoenicians (Cooney and Kolb 2007). As a consequence, the Greeks subdued a local tribe, the Sicels, hence seizing fertile lands for centuries (La Rosa 1996: 523-532; Serrati 2000: 10). After a long period of formation of the Greek settlements (Berger 1992: 15-56; Morakis 2011; La Torre 2011: 5-66), the south-eastern part of the island was dominated by Syracuse, which quickly - already in 5th century BC - became one of the most developed and populated towns of the Antiquity with great political, economic and military power. The island witnessed an onset of significant changes, which were later continued by the Romans, who were fully aware of Sicily’s wealth long before the first Punic War (Millino 2003: 105-127). When they captured the best part of it in 241 BC and even after Syracuse decline in 212 BC, the Romans had no consistent vision of how to govern and cultivate the island. They knew perfectly well, however, how to use its natural resources, not only for their domestic needs, but for the Rome’s benefits as a whole.

The Greeks and the Romans, just as their predecessors and successors, degraded the natural environment of Sicily. Favorable climate conditions and fertile soils of the island were its blessing as well as a curse. The island, however, should be analyzed fractionally, piece by piece, with restricted areas, since its particular regions differed considerably from each other and developed distinct ecosystems throughout the millennia. One of such regions are the Hyblaean Mountains encompassing the south-eastern part of Sicily and characterized by elevations amounting to over 600-800 meters above the sea level as well as broad gorges carved by watercourses in limestone plateaus (Romagnoli et al., 2015). It is also a volcanic area (carbonate and volcanic rocks covered by Plio–Quaternary volcanic layers and by Lower Quaternary marine sediments) formed between the Upper Cretaceous–Miocene and Pleistocene with its most famous volcano of Monte Lauro (Bousquet and Lanzafame 2004: 165; Lentini and Carbone 2014: 37, 39).

It is highly probable that before settlements appeared in the area, majority of it was covered by Mediterranean woodlands and abundant in wild game and lush and dense vegetation. A period of considerable environmental transformations was already the Neolithic, which witnessed a spread of settlement as well as domestication of plants and animals. Development of breeding and gradual domesticating of wild species utterly altered the core of the contemporaneous economy, and more importantly, which was accompanied by dramatic changes in the environment. The same was true for farming and successive tearing more and more land from the nature. The landscape, despite all this, remained wild and forested. The intensive incursion into the environment was continued in the Bronze Age, when Sicels appeared in the south-eastern part of Sicily in the first half of the 15th century BC (Crouch 2004:89). Settlements accompanied by necropolis reached increasingly high onto the slopes, plateaus, and mountains. Subsequently, also Greek and Roman expansion changed a lot in the landscape of the Hyblaean Mountains. When Syracuse started to develop and its inhabitants grew in numbers, new lands for settlement, farming, and breeding were sought (Domínguez 2006: 274). This search was directed westwards and inland, into an inaccessible and hitherto uncharted terrain. That exploration resulted in foundation of a sub-colony of Akrai (the Greek Ἀκραί, Latin Acrae, Agris, Acrenses), about 664/663 BC, in the south-eastern outskirts of a contemporary town of Palazzolo Acreide, by settlers from a Dorian metropolis of Syracuse (Fig.1.A). The localization on one of flat hills of the Hyblaean Mountains, called Acremonte, at the height of ca. 770 meters above the sea.
level, and between the rivers of Anapo (Anapus) to the north, and Tellaro (Helorus) to the south-west, certainly was not a mere coincidence (Fig.1.B).

The hilltop offered a splendid view of the whole area, enabling surveillance of any potential threats, as well as the neighboring fertile lands, sources of fresh water, supplying also the colony-mother Syracuse, and water traffic (Collin-Bouffier 1987).

Excavations so far brought evidence showing that it was not before the second half of the 6th century BC when a temple dedicated to Aphrodite was founded, potentially signifying Akrai’s transformation into an urban center (Bernabò Brea 1980-1983). Until the 3rd century BC, Akrai retained marginal importance, seemingly completely dominated by Syracuse, equally in political, cultural or economic contexts. Intensive development began probably ca. the mid–3rd century BC, under the rule of Hieron II, a Syracusan tyrant in 270-216/215 BC, as attested by buildings erected then: a theatre, with an adjacent small bouleuterion, and stoa, dated probably to the Late Hellenistic period (Chowaniec 2015a, with previous literature). Such buoyant action in the 3rd century BC is confirmed also by the inscription IG XIV.217, which attests renting public space for artisanal and commercial activities by citizens as well as inhabitants of neighboring villages (Manganaro 2004: 115-122). But from the archaeological evidence, only the phases of alterations of some buildings (e.g. reconstruction of the theatre) or isolated artifacts allowed for the hope that habitation of the town was continued even after the takeover of Syracuse by the Romans. There were many blanks in this part of its history. The lack of accurate knowledge on the natural environment of the town and its surroundings, the gaps in its history and the absence of domestic structures have inspired recent research by the University of Warsaw in strong cooperation with Soprintendenza dei Beni Culturali e Ambientali di Siracusa’1 (Fig.1.C).

Research conducted between 2011 and 2015 focused on exploring and documenting the architecture remains revealed within the original Late Hellenistic-Roman residential complex and Late Roman-Byzantine strata, which more or less represented reoccupation of the early foundations. The destroyed layers, registered between two main
phases, were probably associated with an earthquake that occurred around the second half of the 4th century AD. This period was characterized by unusually intensive seismic activity in the area, the most significant of which was the disaster of ca. 365 AD (Barbano et al., 2014; Bottari et al., 2015). Libanius (314-392 or 393 AD), an ancient writer, noted that many zones in the Mediterranean, including Sicily among others, were affected by seismic activity. Guidoboni et al., (1994) date the disasters which influenced Sicily to between 361 and 363 AD, during the reign of Julian; however, Stiros (2001) dates them to between 363 and 365 AD. Additionally, the nee phase of research in Akrai concerns also the archaeometric studies, multidisciplinary reconstruction of ancient diet and local landscape and geology of the region, elaboration of material culture and human relationships.

So therefore, the Greek Syracusan infiltration of the Hyblaean Mountains since the mid-6th century BC brought emergence and subsequent development of urban centers, which sparked population growth in suburban areas as well as an increased demand for farming land and roads. Akrai was no exception. Developing town erected new public buildings, such as temple, theatre, bouleuterion, and houses, which required a supply of stone. The most convenient source of it was a deposit of fine yellowish-brown marly limestone in Acremonte hill (Lentini and Carbone 2014: 59), because of the geological structure very easily worked. As a consequence, two quarries were arisen inside the town (today called Intagliata and Intagliatella) (Bernabò Brea 1956), thus irrevocably damaging the structure of the plateau. Besides that, the quarries were reused as necropolis, especially since 4th-5th century AD (Wilson 1990: 153), which continued to violent the structure of the hill.

Surroundings of the town were also exploited economically and developed. Some extra muros sanctuaries (e.g. a Cybele sanctuary in Santoni or the Tempi Ferali) and necropoleis were established, but first and foremost land was used for farming and planting olive trees, which were introduced into the island by the Greeks. When the Greeks were founding poleis, their first need was arable soil for their citizens, since they lived off the land and possessed farms of the oikos type. The farming land (kleros) was divided between new settlers (Lengauer 1999: 33). Usually the farms were situated on the natural terraces, with the comfortable access to the cultivated fields (Fig. 2).
The constantly growing population of town also exploited natural water sources, mainly local ground water, coursing within Plio-Pleistocene volcanic deposits. Virtually every household had a cistern or a well depleting the existing sources. It was the backbones of the municipal water supply, therefore tanks were often re-used, for example of Akrai one (Fig. 3). The cistern, usually pear- or bell-shaped, in the lower part were cut in the natural rocks, but the upper part of walls and an inlet of small size were cover by stones. Very often the walls had been plastered with hydraulic mortar.

Since the 6th century BC, artisanal activity, including metallurgy, was introduced and then intensified here, which was followed by further exploitation of local raw resources and wood indispensable for firing pottery, smelting, woodcarving, etc. Furthermore the shipbuilding could also played a major role in deforestation of the area of Hyblaean Mountains, most probably also in the vicinity of Akrai. A true treasure trove of knowledge on natural resources and environment, 'The Natural History' by Pliny the Elder, reports that Hieron II built 'two hundred and twenty ships wholly constructed in forty-five days' (Pliny the Elder XVI.74.192), which implies he must have used wood from the nearby wooded mountains, Hyblaean Mountains among others.

Due to clear judgment and diplomacy of above mentioned king Hieron II, towns of the Hyblaean Mountains – incorporated by the Kingdom of Syracuse – were spared destruction, when the best part of the island was devastated during the Punic Wars in the 3rd century BC. However, after Sicily was
completely subdued by the Romans, anyway Akrai entered their sphere of influence and was listed as one of the stipendiare civitates, i.e. it was obliged to pay a tribute to Rome (Pliny the Elder III.8.91). The account by Pliny the Elder indicates that at the time Akrai held a status of a self-sustained town, however dependent on Rome (civitas decumana), populated and functioning well within the new political framework, and doubtlessly collecting taxes in the grain from the surrounding areas.

Admittedly, the Romans used natural resources with much more panache than their predecessors. The Greeks mostly owned small homesteads run by their owners. But it was probable that were also large landowners (De Angelis 2016: 208-209). Already mentioned inscription IG XIV.217 provides epigraphic testimony to the intensive land exploitation of town and vicinity of the town by small landowners, and proves division of the land of Akrai/Acrae into 24 terrestrial areas (Prag 2003: 125; Manganaro 2004). Roman administration, on the other hand, developed medium and large-scale farms as well as introduced hierarchical governing structures and slaves as the basic workforce. Implementation of many new farm tools (e.g. falk, i.e. a kind of a sickle, a wheeled coulter, a harrow, an ox or donkey-driven reaper) improved farming ergonomics, which reduced work costs and increased productivity (many examples of such tools were found during the archaealogical excavations in Akrai/Acrae). Technical advancements allowed for a deeper soil penetration and cultivation of land previously unfit for growing crops. At the same time, environmental annihilation intensified as well. Better agriculture changed quality of domesticated plants and resulted in introducing new species: Emmer wheat, followed by sesame, lucerne, oats, etc. According to an account by Pliny the Elder’s ‘The Natural History’, the number of fruit tree species, e.g., figs, also increased. Pliny reported after Cato: ‘Since his day there have so many names and kinds come up, that even on taking this subject into consideration, it must be apparent to every one how great are the changes which have taken place in civilized life’ (Pliny the Elder XV.19 (18).72). Also Macrobius, an ancient writer, active between the 4th and 5th centuries AD, quoted many more names for fruit trees than writers from the 1st century BC and the 1st century AD (Kolendo 1968: 9).

Archaeological sources seem to confirm such state of matters. A few kilometers to the south-east from Akrai, in Contrada Aguglia, excavations between 1960 and 1962 and in 1968 uncovered relics of a farmstead dated to the mid-3rd through the 1st century BC (Pelagatti 1970). Additionally, the surveys in 2009-2010, indicated that many Hellenistic and Roman archaeological sites, in type of rural settlements and small farms, existed around the town (Chowaniec and Matera 2013) (Fig. 4).

Information about the exploitation of environment is also proved by osteological analysis and archaeo-botanical remains collected while the archaeological excavations in Akrai. As it was invoked, the mountainous landscape provided better conditions for vegetation, grazing and husbandry. Therefore, the domestic animals dominated in the mammal remains. Among them the four livestock species predominated: cattle, sheep, goat, ship/goat and pig. There was still a smaller amount of bones and teeth belonging to horse, donkey, dog and cat. Despite the remains of wild species were represented mainly by cervids (red deer, fallow deer and red/fallow deer), leporids (hare, Pallas rabbit), wild boar, a predatory animal characterized by the size of a fox and hedgehog. More than 150 bones were identified as birds bones, mostly attested by domestic chicken, goose, but also by rock partridge, pigeon/dove, thrush and only one bone was identified as Eurasian eagle–owl. Some species remarked above do bear butchery marks and could be included in the data related to consumption (e.g. cattle, sheep, goat, family Cervidae or chickens) (archaeozoological elaboration cf. Gręzak 2015). Beside that other classes fulfilled a different function in local economy, e.g. transport targets or as the pets, etc. For instance in the Roman world cats were used usually in the granaries or storerooms to protect grain from rodents (Donaldson 1999).

The archaealogical excavations brought also some carbonized archaeo-botanical materials. Among them mostly fruits were registered. The common findings were stones of wild olive, walnut shells, plum stones, and cereals. Olive and wine productions were also recognized in the ancient town, since the rock-cut press-beds with a small collecting cup-mark were discovered there. The olive oil and wine were transported in amphoras, discovered within the town in large numbers (Chowaniec and Gręzak 2016).
4. CONCLUSIONS

Slow, but persistent penetration of new terrains allowed people to make use of further environmental goods (soil, natural resources). It seems almost a truism that human activity caused depletion of wilderness areas and woodlands (extensively about e.g. hunting in the ancient world Anderson 1985). Demographic growth, connected to the inflow of Hellenic settlers and, later, the Romans, affected the amount and quality of both renewable and nonrenewable natural resources. Game was decimated, regarding sheer numbers as well as biodiversity through hunting; wild vegetation was depleted by harvest and development of cultivation and fruit farming; water resources were used not only for drinking, but also for watering fields and in bathhouses; deforestation followed building, carpentry, metallurgy, and demand for fuel.

Certainly, colonization of the Hyblaean Mountains caused an economic boom in the region, but simultaneously significantly unbalanced the local natural environment. When the Greeks arrived here, they changed the economy to the so called Mediterranean. Under the influence of the Greek culture, Sicily was better known for olive oil and wine production. Initially, small farms grew successively, tearing off new pieces of land from nature. Finally, during the reign of Octavian August, especially after the Sextus Pompeius revolt, many big Roman farms (latifundium) were established on the island (Sirago 1995: 174). It certainly changed not only the extent of forests, but also water availability, assemblages of animals and plants, and consequently the human diet.

The Greek and later on Roman occupation, by the intensive pastoralism and hard cultivation brought noticeable modification in the environment (Heinzel et al., 2011). The above mentioned data is essential to deduce what the environment looked like and help us identify the human impact on environment.
It is clearly readable that inhabitants of Akrai based their economy on husbandry, farming, woodland and forest margins goods. The catalog of hunted wild species (e.g. red deer, fallow deer, hare, rabbit, wild boar) by the inhabitants of Akrai contributes to our understanding of the environmental conditions of town (Fig. 5). The presence of cervids remains announces that there were broadleaf and mixed forests with young trees and meadows, as well as mature trees (Geist 1998: 204-206). Hares and boars are mostly found at forest edges or in fields. Thrushes appeared frequently in the gardens, parks, farmland and open woods. While the pigeons/doves were widespread in the mountain cliffs and caves, and sometimes small varieties lived also in more open fields and pastures with scattered trees and in the winter time, in farmland, while the rock partridge lived in mountain–slope limestone rocks, low grass and very sparse trees and shrubs or occasionally sought refuge on the branches of low trees (Watson 2002).

The presence of mentioned wild animals only confirms the well-known opinion (Johnstone 1998) that during the Roman period Sicily had more extensive forests (Scramuzza 1937). The excellent example of great environmental changes in Sicily could be the presence of red and fallow deer, whose bones are noticed in faunal material at many archaeological sites, but now are absent in Sicily (Chapman and Chapman 1975: 61; Davis et al. 2009). It could be linked to the intensive deforestation of that begun in late Byzantine period. The splendid presence of bones and teeth of goats founded in osteological material in Akrai, may also indicate that the local vegetation were vanished while the goats are usually called ‘horned locusts’.

The perfect testimony of the existence of abundant vegetation, and, above all, the plurality of melliferous plants, in the environment of Akrai could be production of honey. Since the Roman Republic, Hyblaean Mountains was widely known and esteemed for honey, especially the thyme type (Bortolin 2008: 46-47). In ‘Natural History’ of Pliny the Elder, was recorded that: *Ibi optimus semper, ubi optimorum doliolis flororum conditur, hoc et Hymetto et Hybla* (XI.13.32), which informed that the honey from Hybla was well known and appreciated by the Romans, as it is also confirmed by Martial (38/41-102/104 AD) in his

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Fig.5. Probable reconstruction of the Akrai’ hilly environment (drawing Żero J.).
'Epigrammata': Favi siculi. Cum dederis Siculos mediae de colibus Hyblaei, cecropios dicas tu licet esse favos (13.105). The lead seals with an image of a bee, most possible used to sealing and transporting the local honey, were discovered in Akrai.

Although, this article gives provisional answers and information about the Greek and Roman impact on the Akrai environment, it clearly indicates an opportunistic human environmental exploitation. Therefore necessity to examine more materials from a larger area and undisturbed layers is obvious. And then this picture will certainly change as more data will be collected while research.

NOTES
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THE CLASSICAL AND HELLENISTIC AGRICULTURAL LANDSCAPE OF ATTICA

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ABSTRACT
The main goal of this paper is to present the characteristic elements which formed the agricultural landscape of Attica during the Classical and Hellenistic periods, as well as to contribute to an understanding of the interaction between human society and the landscape. In the first part, the elements which once formed the agricultural landscape of Attica are presented: farmhouses, cultivation terraces and other installations. This analysis allows the second and most crucial topic of this study to be discussed efficiently, namely the relations between the rural human society and the landscape itself through their bidirectional impact. On the one hand, human activity leaves its mark on the landscape and upgrades it through human craftsmanship. On the other hand, the landscape, far from being a passive formation fulfilling the needs of the community, was in many cases the decisive factor which indicated where a cluster of farmhouses should be built or what kind of agricultural production can be exploited by the human community. In this way, it is anticipated that the main aspects of the reciprocal impact between the landscape and the rural communities can be traced and interpreted.

Keywords
classical, hellenistic, rural, agriculture, farmhouses, Attica

1. INTRODUCTION

The bidirectional impact between a given natural environment and a society is, in fact, a relation and the landscape itself a unique form within this relation (Brunet 2005: 80). Among the various possible conceptualizations of society-landscape interactions, the agricultural landscape is one of the most important. The term agricultural landscape usually defines the visual result of land uses and management systems in an area (Kizos and Koulouri 2005: 183). As the subject of interest in this study is more specifically an historical agricultural landscape, this could be described as the kind of the landscape which results from contact with natural components on the one hand (topography, climate, flora, fauna, soil and water), and the activity of the society on the other. More specifically, the aim of this social activity is agricultural exploitation, and it is determined within specific historical time periods, which in this case involve the Classical and Hellenistic.

Diverse explicit social aspirations and practices, such as the cultivation of one or another crop for consuming or exporting, take place on the landscape. At the same time, the landscape in many cases demonstrates the means according to which agricultural life and agricultural production can be realized, organized and optimized. The result of this interaction is the creation of the agricultural landscape, to wit a kind of landscape that contains the basic features of the natural environment as well as the results brought to it from the rural life of a society. In other words, agricultural landscape can be determined as that which comes from the interferences, the interventions and alterations it has received from the development of the agricultural production by a human community. Human intervention upon the landscape during the periods
under discussion had many expressions that could be summarized in three interrelated levels: firstly, the establishment of farmhouses upon a landscape; secondly, the formation of their wider area with a variety of structures and installations for the serving of the omnifarious agricultural needs; and thirdly, the cultivation of diverse crops, on the basis of what a given community needs to cultivate each time.

As each historical agricultural landscape is a compilation of specific data, an attempt to investigate the interaction between the landscape and the society of Athens and Attica during the Classical and Hellenistic periods has as a starting point the determination of this historical rural landscape through its numerous archaeological remains. Considering the most prominent of these remains allow us to identify some characteristics of the social activities related to rural life. Analyzing these data raises the question how each of these relates to the conversion of a natural landscape into agricultural and if and which sectors of the social life are involved each time.

2. THE NATURAL LANDSCAPE OF ATTICA IN ANTIQUITY

Attica constitutes the southeastern part of mainland Greece. It forms a triangular peninsula whose southern point penetrates into the Aegean Sea, having to the east the southern Euboean Gulf, to the southwest the Saronic and to the northwest the Corinthian Gulf. Strabo (9.1.3) describes Attica as a narrow country that widens towards the interior, that is, the plain of Mesogeia. Although the southern and eastern boundaries of Attica have always been more or less obvious, as they are identical to the coasts of the peninsula, in classical years the western and northern boundary of the territory of Attica needed to be clarified. Plato (Critias, 110.d-e) delimited Attica to the west at the narrow strip of land of the Isthmus, including thus the area of Megaris. According to the philosopher, the border of Attica expanded to the east across the mountains of Kithairon and Parnitha, reaching the coast of Oropos. Another ancient testimony is delivered by Xenophon (Memorabilia, 3.5.25), who stated that the boundaries of Attica were on the mountains towards Boeotia where there were narrow inlet passages to Attica.

The soils of Attica are to a greater extent rocky, without very fertile plains. For this reason, Thucydides (1.2.5) characterizes Attica as "λεπτόγεω", i.e. non-fertile, poor and barren land. Instead, the land of Attica in the past was more suitable for stock-raising according to a testimony delivered by Plato: "τά τε αὖ περὶ τὰ ζῷα ἱκανῶς ἥμερα καὶ ἄγρια τρέφουσα" (Critias, 114e). However, agriculture was a key part of the economy during the Classical and Hellenistic periods. Across the available fertile lands, especially in the Mesogeia area but also in almost every part of the territory of Attica, the human community tried and managed to take advantage of the natural surroundings, cultivating them and forming the rural landscape.

3. THE AGRICULTURAL LANDSCAPE OF ATTICA: DEFINING ITS BASIC FEATURES

Anthropogenic intervention, which transformed the landscape from natural into rural, is detected through three interdependent axes. The first axis concerns the very buildings of the farmhouses, constructed in selected areas as initial configuration cores of the wider rural landscape. The second contains all the small- and large-scale interventions and arrangements around the farmhouses whose aims was cultivation and exploitation of the land. The third axis concerns the agroecosystems of a landscape, to wit the grasslands and the cultivated fields.

The primary cores of the agricultural production and hence of the rural landscape, the farmhouses, were scattered across the landscape of Attica. Farmhouses characterized every permanent installation in the countryside, far from the urban environment, regardless of its size and form, either isolated or integrated into a cluster of more farmsteads, whose inhabitants were engaged in one or more aspects of
agricultural life and production. The farmhouse includes all those spaces where the occupants resided and were employed. Their basic elements in Attica were mainly three: the house, the yard and the tower (Young 1956: 138), but in reality these can be found arranged in a variety of combinations. Based on the plan and space arrangement of these three elements and taking into account their morphological characteristics, it is possible to distinguish the Attica farmhouses according to four basic types (Dimakopoulos 2015: 1001-1005). The first type contains houses of square or rectangular plan, in which all the rooms, facing inwards, are arranged around a central court. A good example of a rural house of this arrangement, which actually replicates the plan of a typical townhouse, is provided by the Dema House (Fig. 1), located in the area of Ano Liossia and dating to the late 5th century BC (Jones, Sackett and Graham 1962: 75-114; Jones 1974: 293-313). The second type is similar to the first one, but also incorporates a square or rectangular tower, which occupies one of the corners of the building, as for example in the Vari House (Fig. 1) whose construction is placed in 4th century BC (Jones, Graham and Sackett 1973: 355-452; Jones 1974: 293-313).

Farmhouses of the third type contain a freestanding square or rectangular tower and usually other separated structures in its proximity; a representative case can be found in the farmhouse TH 1 in Thymari valley (Fig. 2), in use from the 5th to the 3rd centuries BC (Lohmann 1993: 459-461). Farmhouses of this type follow a kind of arrangement, which, without resulting in a close unit, are organized more freely into the landscape. The fourth type is similar to the third one, with the difference that here the tower is always circular and a typical case of such type is the Princess Tower in the area of Sounio (Fig. 3), constructed in the second half of the 5th century BC (Young 1956: 122-124; Goette 2000: 82-83). In Attica, farmhouses that were constructed during the 5th and 4th centuries BC and were in use, more or less, during the early Hellenistic times, in most cases belong to one of these four types. Nevertheless, other farmhouses which follow a more irregular design, and thus cannot be added to these categories, occur as well.
Fig. 2. Farmhouse TH 1 with square tower, threshing floor and outer buildings
(Source: Lohmann 1993: 146 fig. 24).

Fig. 3. The Princess tower: 1: round tower, 2: threshing floor, 3: tomb terrace, 4: ancient road, 5: marble quarry
6: Astike Odos, 7: modern road (Source: Goette 2000: pl. 88 fig. 179).
Once the farmhouse was built, it was possible for manifold interventions in its wider area to take place in order to serve and facilitate cultivation and planned agricultural production in general. Usually, the extent of these interventions, which contain mainly agricultural terraces, threshing floors, wells, irrigation systems and all the boundary walls that demarcate the land, is identical to the extent of the property of each farm. The ancient cultivation systems do not always leave visible remains, as the landscape is constantly re-sculpted over the years; however, in some cases the remains of the cultivation activity can be very impressive. In Attica the cultivation technique in terraces\(^2\) was widespread, occurring to an impressive extent, mostly on the slopes of southwestern Attica, facilitating principally the growing of the olive trees (Fig. 4) (Lohmann 1993: 196-219). Although various types of land formations using terraces such as stepped, braided and pocket terraces are generally distinguished (Rackham and Moody 1992: 123), in Attica the stepped terrace systems largely dominated. These terraces are usually parallel to each other and follow as much as possible the geomorphological relief of the slope. Specific crops do not necessarily coincide with specific types of terracing\(^3\).

The main reasons for choosing this kind of cultivation system in levels can be summarized as follows: Firstly, this achieves redistribution of the sediment. Secondly, it is a convenient solution to significantly increase root penetration. Thirdly, the surface of a slope which is about to be cultivated, becomes less steep and therefore easily processable by the farmer. Fourthly, sheet and gully erosion is controlled. Moreover, absorption of water from the soil in cases of heavy rainfalls increases. Finally, walls can be constructed out of the stones, which would otherwise interfere with cultivation\(^4\) (Rackham and Moody 1992: 124). To these main reasons can be added one more, the heat absorbing effect of both terrace walls and the soil behind it, something vitally important for those terraces facing south, which in this way preserve the solar heat received during daytime (Krasilnikoff 2000: 181). Nonetheless, apart from the obvious advantages, certain risks may lurk behind this kind of cultivation in some cases, the most important of which are the increasing peril of slumping and the dispersion or burying of the existing soil (Rackham and Moody 1992: 124).

As it has become evident that the diet of the ancient Greeks depended heavily on the consumption of cereals\(^5\), another element, clearly on a smaller scale when compared to the terraces, are the threshing floors, which are expected to be found in the rural landscape (Figs. 3-4). Directly related to the agricultural life of an area, threshing floors are clear evidence that the inhabitants of these sites were involved, either exclusively or among other activities, in the production and processing of the grain and cereals necessary for their diet. Despite the difficulty posed concerning their identification by archaeological research as their simplistic construction rarely leaves visible traces in the landscape, in Attica several sites have been pinpointed.

Threshing floors are specially designed permanent outdoor areas at some windy point of the farm, where the process of threshing and winnowing took place in order to achieve separation of the fruit of the grain from the ears. Typically, they are of circular shape and their the diameter in Attica can vary, measuring from 12 to 28.30 m., depending on the amount of production, the size of the farm and geomorphological factors. Typologically they can be distinguished according to two categories. The first includes paved stone and the second earthen threshing floors (Foxhall 2007: 60). The latter are more frequently encountered, as this construction would cost comparatively less than the stone paved ones and would also be easier to construct, albeit the lack of paved floor is precisely what makes them difficult to detect in the contemporary landscape. Their perimeter may be defined by a series of stones, but in other cases such a clear delineation may be absent, as in the threshing floor of the site TH 35 in the valley of Thymari in southern Attica (Lohmann 1993: 478-479). Beyond their construction style, the threshing floors in Attica can be differentiated also depending on the status of their property: it is known that there were the private ones, which were parts of farms, and also some public threshing floors that served the agricultural needs of those whose land property did not include such an installation\(^6\).

Another feature of the rural landscape is the abundant boundary walls that once delimited the land properties. It is interesting that in some cases their track across the landscape can be observed for a
significant length, as in the classical farm of the Cliff Tower in Sounio (Young 1956: 124-126; Langdon and Watrous 1977: 173-175; Goette 2000: 81-82). Apart from defining each owner's land properties, another practical application of such walls in the area of Attica was the distribution of productive activities (agriculture, livestock, metallurgical-mining etc.), so each one could be feasible, in parallel, without one hindering the other. Such walls became known mainly from the research that took place in the territory of the ancient deme of Atene in the southwestern coast of Attica, allowing the estimation of many landholding sizes (Lohmann 1993: 219-226). To the agricultural landscape's features can be added the numerous wells, as necessary additions of every farmstead. The presence and the management of the water element was of paramount importance, as the entire area of Attica belongs to a zone where scant rainfall occurs (Bresson 2007: 42).

Finally, beyond all these structures, another main feature of the agricultural landscape is the different plant species that had been used for cultivation and are recognized not only from the aforementioned installations but also from the archaeobotanical remains themselves where available. In Attica all the aspects of Mediterranean triad cultivation, the main features of ancient Greek agriculture, namely grain, olive and grape can be observed. Secondary crops were also cultivated, including a variety of arboriculture, vegetables and legumes (Bresson 2007: 136-139).

4. LANDSCAPE AND HUMAN COMMUNITY

Considering the main features of the agricultural landscape of Attica as defined during the Classical and Hellenistic times, it is feasible to trace the way in which the reciprocal relationship between society and landscape was formed. To some extent, the influence and impact of social needs in the shaping of the rural landscape are almost self-evident from observation of the visible remains of the human activity of the past. The starting point and trigger of any further intervention to the natural landscape in order to transform it from natural to agricultural, is the conscious decision of a society to become occupied in agriculture, and consequently, the very first step in managing the land occurs by selecting locations and building farmhouses. Each farmhouse, no matter whether it belongs to the one of the four aforementioned types or has a more irregular form, as it occupies a given area it automatically interrupts the continuity of the natural landscape and reshapes it by remodeling its surrounding area, both visually and functionally.

The size of the "footprint" of a farmhouse on the landscape may vary. In Attica in particular, farmhouses are found that can either be characterized as closed units, with a clearly defined outline, or organized with more freedom, forming aggregations of many spaces and buildings. A comparison of farms of small and large footprint can be clarified by collocating the plans of the Dema house (Fig. 1), a rectangular block, 22x16 m. overall (Jones, Sackett and Graham 1962: 75-114; Jones 1974) and the farm of the site PH 2 (Fig. 4) located in the territory of the ancient deme of Atene in southwestern Attica, whose structures stretch over a wide area of 3.600 sq.m. (Lohmann 1993: 409-414). In the first case the various spaces of the farm building are defined clearly, as they are compactly organized around a core, the inner courtyard. In contrast, the tower of farm PH 2 as well as all its other spaces are scattered on the hillside and therefore define in a more ambitious way the landscape in which it was chosen to be built.

While in each case the farmhouse occupies a given area on a site, leaving its footprint on the ground, the spatial perception of height on the landscape is also often redefined. In some occurrences, when a farmstead contains a tower, the element of the height dimension is added in the most imposing way to the visual perception of the landscape. This is particularly striking in agricultural towers such as the 4th century BC square tower C and the circular tower F in the Vathychoria valley of Megaris in western Attica (Fig. 5), with a calculated initial height of 11,50 m. and 13.50 m. respectively (Thielemans 1994: 128-130). The dramatic change in the spatial correlations of a landscape with the additions of such high constructions is realized when one considers that the towers are not located within a structured urban environment where
Fig. 4. Farmhouse PH 2 with tower, outer buildings, threshing floor and agricultural terraces (Source: Lohmann 1993: 163 fig. 33).

Fig. 5. Classical farmhouse (Tower F) in the valley of Vathychoria (Source: S. Dimakopoulos).
the impression of the height might be cushioned by the many neighboring buildings and structures, but in a free, previously unstructured landscape.

Over and above any visual change in the landscape while it transformed from natural to agricultural, the most essential trope has to do with its changing functions. The substance of the agricultural landscape is established by the imposition of specific species for growing and this is a factor which would create different shades of the same landscape from time to time, as the cycles of the crops do not always coincide. For example, the cycle of viticulture was different from the cycle of the cereal crops (Bresson 2007: 129).

By setting up a farmhouse as a cell of production, storage and living space of the owners, the conditions for further interventions in the landscape have been created in order to develop the cultivation of different crops. Some cultivation techniques leave zero or a minimum footprint on the landscape, as for example the ancient vineyards which were created by planting in trenches (shallow ditches), in holes or excavating the whole field. In these cases, the interference produced by the ancient farmers was transient. As long as the cultivation was maintained, the texture of the landscape changed, but when it ceased, its traces typically became lost with the passage of time. The cultivation of grain in Attica also left only a few traces in the landscape as the threshing floors, the typical proof of this rural activity, are hardly preserved.

However, sometimes the need of a society for specific crops may result in the processing of the geophysical characteristics of a landscape, or even modify them almost totally. Human intervention into the landscape is visibly better in the remains of the olive-tree cultivation, and particularly in those areas where creating systems in terraces was preferred. In Attica, the terraces as a feature of the agricultural landscape, have been far more permanent than those of any other crop, and in many cases it is possible to detect the entire extent of their survival through regional survey (Lohmann 1993: 196-219). The spatial distribution of these installations across the farm occupied area is interesting because it makes clear the effort of the farmer to utilize the surrounding landscape to the maximum and take advantage of it in order to exploit the land to its fullest extent (Fig. 4). The residential pattern and layout of the farms with agricultural terraces, generally and widely spread over areas such as the territory of the ancient deme of Atene, shows how the creation of such extensive systems can be closely linked to the intensity of the production at certain times as a requirement of society. In the case of the 4th century BC Attica, the crucial factor for such intervention into the landscape was the increased demand for olive oil. The augmented needs of the society for the olive oil resulted in the reformation of significant parts of the landscape, for the cultivation of olive groves. The villagers of Atene enlarged the cultivable surface by creating extended terraced systems in the slopes of the area (Lohmann 1993: 196-219).

An essential quality of the relation formed between the landscape and society is its bidirectionality. In the light of the fact that climate is a basic feature of the natural landscape, it is apparent that this element had an important influence on the shaping of the agricultural landscape. The restrictions which resulted from the climatic conditions of Attica were a decisive factor which indicated which particular crops could be cultivated and where. Wheat for example, requires soils rich in nitrogen and phosphorus and a minimum of 300-400 millimeters of rain per year for a medium crop, while an ideal level of rain is at least 600 millimeters (Bresson 2007: 126). The growing of olive trees on the other hand can take place both in rich and poor soils (Bresson 2007: 135). Such knowledge for the ancient farmer would be, of course, the result of his longtime experience in his attempts to tame the landscape to his advantage. Having this in mind, in many cases the landscape itself actually was the factor which indicated the areas where the community could cultivate specific crops.

Furthermore, apart from the crops, in some cases the preference for one or other type of farm was not only related to social needs and aspirations but also a choice coming from the geographical particularities of a landscape. Although social factors such as the financial strength of the owner definitely determine to some extent the form that each rural house has, from a number of farmhouses it is understood that sometimes the same landscape imposed the form of a farmhouse. For example, the elongated shape of the farmhouse A in Pountazeza in southern Attica (Watrous-Livingston 1982: 193-197) is dictated by
the geomorphological elements of this area. The orientation of the slope at this site led to the creation of a farmhouse with an elongated shape, which is not usual in Attica. Apart from this, the factor of climate suggested answers to a series of questions, such as which is the most beneficial orientation of a building according to its function, and also in which parts of the landscape some installations, as for example the threshing floors that must be located in windy points, should be constructed.

5. CONCLUSIONS

The interaction between landscape and human community is essentially a kind of dialectic that includes two systems: one that is slowly changing, the natural landscape; and a second one that evolves more rapidly over time, human society. The colloquy of these and the contact between on and the other creates a unique conceptualization which can be interpreted as rural landscape. From all the features of Attica’s historical agricultural landscape, this interaction can be better identified and understood in and around the core of every farmhouse where many indexes of the historic agricultural activity can be found. The threshing floors, the cultivation terraces and the other remains of the rural activity unveil the aspirations of the society for agricultural production. While the above are taken into consideration, it cannot be ignored that human aspirations could not be materialized uncritically upon the landscape of Attica, but only through a deep understanding of this, of its special features and of its particularities.

NOTES

[1] It is a fact that agricultural and stock-raising activities, although often developed simultaneously, rarely happen in balanced and uniform way, as the growth of one of the two automatically entails the deprivation of another.

[2] The formation and arrangement of a slope at various levels in order to be cultivated is a very old practice widespread in Greece, in the Mediterranean area and in other areas as well. Such techniques are typical of many rural landscapes in classical times, as for instance on many islands of the Aegean. A typical example is the case of Delos, where the rural landscape has been preserved almost intact over the centuries and the terraces can be observed till today. On the ancient agricultural landscape of Delos see Brunet 2005: 86-101, with further bibliography.

[3] Rackham and Moody correlate different types of terraces in specific crops, while pointing out that this is not binding and that a terrace system can accept almost any type of crop, depending on the needs (Rackham and Moody 1992: 124-125).

[4] This fact was highlighted also during Roman times by Columella (De Re Rustica, 2.2.12).

[5] Grain, which provided at least 70 percent of the needed calories, was an essential element of the ancient Greek nutrition. The main variety of wheat used was triticum durum, a variety of hard wheat (Bresson 2007, 125).

[6] Public threshing floors, available for any farmer who wished to use them, are known from a 4th century BC inscription of the Rationes Centesimarum, i.e. inscriptions concerning mainly land sales in Attica (Lambert 1997: 52 F7A lines 17-18, 208-209).

[7] Cultivation techniques are referred from Strabo (15.3.11) and Pliny (Natural History, 17.35.166-167).

[8] A rare case of preservation of ancient vineyards can be found in Attica in the valley of Mesogea, consisting of systems of parallel series of trenches (Raftopoulou 2013: 142-144). These vineyards seem to be dated in a wide chronological range, from the early Classic to Roman times. Outside Attica, many similar farming systems based on the trenching method have been found, as for example, in Nemea (Pikoulas 2000-2003: 395-400).
**BIBLIOGRAPHY**


ABSTRACT

The following is a summary of the results achieved by the mission "Medieval Petra" by the University of Florence on the site of the Crusader castle of al-Wu’ayra, pointing out its wide chronology (Nabataean to Late Islamic) and the radical changes in the landscape there.

A new session of research started in 2011 seeking to match maximum preservation of the site to maximum archaeological productivity, aiming at reconstructing the artificial modifications of the landscape, as the result of the changing needs of the inhabitants.

A wide Nabataean necropolis/sanctuary area was identified which included a quantity of different types of tombs cut into the rock. Most probably the function of the site changed radically during the Late Antique period and it was transformed into a permanent settlement. Some Nabataean sacred complexes were transformed into cisterns for the collection of water. The Crusaders rearranged the whole site and the Late Islamic reoccupation developed through the building up of a new village that continued to be inhabited until the late 19th century.

Keywords
Light Archaeology, Historical Landscape, Petra, al-Wu’ayra, Crusader, Islamic

1. INTRODUCTION

Al-Wu'ayra is located North-East of the ancient town center of Petra, beyond Jebel al-Khubtha, on the eastern border of the Petra Archaeological Park, along the road leading from Wadi Musa to Umm Sayoum and Beida (1). The site has a very characteristic conformation: a number of narrow and sub-parallel wadi separated by sandstone ridges smoothed by weathering (Fig. 1). Isolation is the only relevant feature of al-Wu'ayra so apparently this was the reason for choosing the site for funerary purposes in Nabataean times. Since Roman-Byzantine times its proximity to the road and Petra itself also played a role, but this time for military reasons.

Both for building purposes and for everyday use all materials had to be brought to al-Wu'ayra due to lack of resources in the area. From an archaeological point of view this means that the site became an undisturbed archive of data (Fig. 2) so any data from al-Wu'ayra is therefore of great relevance and of reliable documentary value to the history of the site.

1.1. Methodology

The stratigraphic sondages and surface collection carried on during previous campaigns not only pointed out the presence on the site of architectural elements and objects dating back to Nabataean times (Vannini
and Vanni Desideri 1995; Tonghini and Vanni Desideri 1998), but also artifacts and building techniques peculiar to Roman-Byzantine Petra (1). Since 2011 archaeological research focused on the extension and the characteristics of these pre-Crusader phases and a systematic mapping of the structures cut into the rock, i.e. stairways, post-holes, niches, platforms, channels, cisterns etc. were started in order to ascertain their chronology and function. The aim is to consider such traces as clues to the different uses of the area.
in order to understand how the landscape has been modified according to differing needs and purposes throughout its history (Vanni Desideri and Leporatti, 2014; Vanni Desideri and Sassu, 2014: 95-100). This new session of research has been planned and performed with light archaeology methods including low altitude aerial photographs and 3D surveys.

2. HISTORY OF A LANDSCAPE: AL-WU'AYRA FROM NABATAEAN TO LATE ISLAMIC TIME

The 2013-2015 campaigns demonstrated the existence of a wide funerary area that extended to the whole surface of the castle, showing its articulated topography following the geological conformation of the site. Each single wadi was transformed into a funerary complex provided with stairways leading to the tombs sometimes protected by doors (Fig. 4). Possibly this reflected ownership by separate groups of worshipers i.e. family, tribe or congregation (2) and benches were provided for the commodity of group worship and recurring devotional activities (Fig. 5). It would seem that when the natural wadis were no longer available, artificial wadis were carved into the bedrock in order to place additional tombs. The tombs are of different types: ranging from the simple oval or rectangular grave, often protected by a niche, to the more rare and elaborate type with a facade, sometimes giving access to a funerary chamber. One constant element of the tombs is their close connection to water which is provided by channels cut into the rock and small cisterns. Liturgic activities where probably performed around the platforms located on the highest spots of the site (Fig. 6).

During this phase the round rock, later used as the entrance gate to the castle, was still connected to the area of the necropolis and its upper part was a completely carved dome shaped form (Fig. 7)(3).

During phases occurring between the 2nd century and the Early Islamic period the function of the site changed radically. It was transformed into a permanent settlement the characteristics of which we can only deduce from building techniques and structures peculiar to this period. For the first time in the history of the site, the inhabitants made use of limestone blocks obtained from a geological formation at the top of the mountain East of al-Wu'ayra. These where probably arranged in order to form a curtain wall. Identified for the first time at al-Wu'ayra in the 1998 campaign, this Roman/Byzantine phase, was later recognized also

Fig.3. Ortophoto mosaic of the site of al-Wu'ayra obtained from low altitude aerial photographs taken by a balloon (photos by ITABC, CNR, Rome; process by P. Drapp CNRS, Marseille).
Fig.4. The Nabataean necropolis/sanctuary of al-Wu’ayra. The funerary use of a wadi (UT 212).
3D survey by S. Leporatti, A. Vanni Desideri (2015 campaign).

Fig.5. The Nabataean necropolis/sanctuary of al-Wu’ayra. The rock cut facade of a tomb with three loculi (UT 245).
3D survey by S. Leporatti and A. Vanni Desideri (2015 campaign).

Fig.6. The Nabataean necropolis/sanctuary of al-Wu’ayra. The highest spots as religious installation: stairways (UT 187, 214) leading to the platform (UT 215). Photos by A. Vanni Desideri (2013 campaign).
at ash-Shawbak. The presence of a curtain wall contemporary to the transformation of the dome shaped rock into an actual entrance gate, defended by a tower (Fig. 7), seems to strengthen the hypothesis of a military function ascribed to the site during this period.

Various technical arrangements of the same installation emerged from research. For example an elevator, perhaps meant for transporting the limestone blocks from the processing area to the yard itself, supplied by a complicated hydraulic network (Fig. 8). The water appears to have been collected from a small wadi running from the western side of the mountain down to Wadi al-Wu’ayra via a network of channels cut in the rock. It lead to an artificial basin obtained by blocking a natural depression with three dams. In addition, some Nabataean sacred complexes were transformed into cisterns for collecting water.

This Late-Antique fortification was then remodelled during the short Crusader period and the whole installation was rearranged.

The Late Islamic occupation of the site developed through at least three phases. These started with the spontaneous use of structures still standing and continued with the recycling of materials from collapsed buildings to construct a new village. This continued to be inhabited until the late 19th century.

3. CONCLUSIONS

The very particular morphological and archaeological conditions of al-Wu’ayra (isolation and wide chronology) has stimulated the planning of the most suitable and productive strategies of research, thus working as an actual open air testing laboratory. An exhaustive interpretation of the history of the site has been produced, taking into consideration even the most questionable and often underestimated archaeological data (such as traces cut in the rock, or the stratigraphy of collapses), emphasizing their documentary value. Beyond the most evident and structurally imposing phases, the research allowed the
reconstruction of the entire history of the landscape, through its 'minor' dwelling systems. This includes the 'history of the ruins' that developed because of recycling, squatting and semi-nomadic use which alternated with the total abandon of the site.
The isolation of al-Wu'ayra, whose Arabic name means “site of difficult access”, has been interpreted according to the different historical and cultural conditions of the local communities. The newly discovered necropolis/sanctuary of al-Wu'ayra close to the capital, fits very well, as in many other cases, with the safety conditions ensured by the political and economic stability of the Nabataean kingdom that extended from Awran to Sinai and North Arabia.

The site was then reinterpreted as a military outpost controlling the access to Petra, part of the Roman-Byzantine *limes arabicus*, a role revived later on, under the rule of Baldwin I. He built the castle of *Li Vaux Moises*, between 1100 and 1108, as the main point of defense in the territory.

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**Fig.10.** Late Islamic al-Wu’ayra. Aerial view of two dwelling units (UT 145, 153) and a livestock enclosure (UT 154). Orthophotography by ITABC, CNR, Rome; interpretation by A. Vanni Desideri (2013 campaign).

**Fig.11.** Late Islamic al-Wu’ayra. The survey shows how the village increased from right to left by the progressive addition of dwelling unit. Survey by E. Donato and A. Vanni Desideri (1999 campaign).
At al-Wu'ayra the archaeological traces of the Islamic occupation are very readable. These developed with the setting up, in dry stone technique, of an actual village taking advantage of the collapsed materials of old Crusader buildings and occasional dwelling units (bivouacs). A completely different landscape appears for the first time in the history of this area. The result was that the territory no longer had to rely on towns, as had been the case during Late Antiquity in the Near East. From this point of view, six centuries later, the Islamic new foundation of Shawbak by Salah ad-Din restored the important role of the town in the area.

The site of al-Wu’ayra is an important archive of data concerning the entire history of the landscape around Petra but it is also an extremely fragile site. A specific project is currently under way combining protection and educational activity for the local population and for tourists, taking into consideration the increasing danger for the preservation of the site, all in accordance with updated public archaeology methods.

NOTES
[1] This paper is based on the methodological experience of the Chair of Medieval Archaeology of the University of Florence used in the field of landscape archaeology (‘from light archaeology to public archaeology’) during the mission ‘Medieval Petra. Archaeology of the Crusader-Ayyubid settlements in Transjordan. Such new study shows very clearly how extensive and non destructive archaeological methods are particularly appropriate to the difficult surface condition of the site, its fragility and the very precarious equilibrium of its poorly preserved buildings.

[2] About the groups as owners or managers of funerary complexes see Alpass 2013.

[3] The particular shape of the rock, apparently unusual among Nabataean monuments, seems to resemble representation of some idols in the area of Petra such as the one in the Siq (Dalman 1908; Moutsopoulos 1990; Healey 2001: 155-158).

BIBLIOGRAPHY
TRACING THE ONSET OF THE ANTHROPOCENE NEAR CRACOW. DIACHRONIC CHANGES IN LANDUSE AT MODLNICA (SOUTHERN POLAND) REVEAL EARLY HUMAN IMPACT

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ABSTRACT

Large-scale excavations on a loess hill in Modlnica near Cracow allowed for a detailed insight into the occupation history over the last 7.5 thousand years. A major shift in the landuse pattern observed after 300 B.C. (discontinuation of residential function in favour of economic and cult uses) is believed to be the result of earlier, long-lasting human-induced modifications (deforestation, erosion and desiccation) of the hill. This local scenario became a starting point to express some general observations on the ‘acceleration’ of the human impact at the beginnings of the Iron Age in temperate Europe (800 B.C. – A.D. 100). More or less from this period on, the anthropogenic pressure increased and became large-scale and permanent. In the ongoing attempts to position the onset of a new, human-dominated geological epoch (the Anthropocene) in the timescale, broad B.C./A.D. boundary should be considered as one of the key steps towards determining a stratigraphically distinct ‘Anthropocene’ (mid-20th century). This view is compatible with the notion of the long-term and stepwise character of this ‘onset’ (the period of ‘Palaeoanthropocene’ sensu Foley et al. 2011).

Keywords
Anthropocene, Palaeoanthropocene, human impact, landuse, Iron Age, settlement

1. INTRODUCTION

The concept of the ‘Anthropocene’ as a new epoch in which human activity began to affect the Earth’s environmental system to a degree stronger by orders of magnitude than in the previous epochs (the Pleistocene and the Holocene) has been vividly discussed in recent years. This began largely with the works of P.J. Crutzen who proposed regarding the rapid rise in fossil fuel combustion at the start of the Industrial Revolution just before A.D. 1800 as the advent of a new epoch (Crutzen, Stoomer 2000; Crutzen 2002). More or less at the same time W. Ruddiman’s (2003) ‘early anthropogenic hypothesis’ was formulated, pointing to a very early start of the noticeable, human-driven greenhouse gases emission at about 6000-5000 B.C., resulting from the spread of agriculture. The date for the beginnings of stratigraphically distinct new epoch is a question of debate, however, because according to many geoscientists, evidence of human activity alone cannot be regarded as a proof for its decisive impact on atmospheric or terrestrial systems. Therefore, some authors tend to see the mid-20th century with its post-war ‘great acceleration’ as the most justifiable boundary from the geological point of view (e.g. Zalasiewicz et al. 2015; Waters et al. 2016).

Among the indicative features of the Anthropocene, several phenomena caused or triggered by man are considered to be the most important. These are: the human-induced emission of greenhouse gases (carbon dioxide from slash-and-burn economy and methane from wet rice cultivation, both beginning possibly from the start of agriculture – Ruddiman 2003; Ruddiman et al. 2016), changes to the Earth’s
surface due to the acceleration of erosion processes (Dotterweich, Dreibrodt 2011), the development of anthropogenic soils (Certini, Scalenghe 2011; Zalasiewicz et al. 2015), or the prevalence of man-made biomes and landscapes (Ellis 2011). To more recent phenomena belong the global dispersal of human-made materials (radionuclides, nitrogen from fertilizers, pollutants, technofossils) into the lithosphere, or the reduced runoff and sand/silt supply to the oceans due to the construction of dams (Zalasiewicz et al. 2015; Waters et al. 2016). In order to fully comprehend the actual modern human impact, the discussion on the Anthropocene focuses on the scope of human-driven changes and their starting points. Many scientific projects in various disciplines aim at setting the particular criteria of the Anthropocene on a timescale. Complex archaeological projects may contribute to this debate as well by revealing how people altered their local environments across millennia and identifying particular ‘points of no return’ within the history of human-made environmental modifications (see Zanchetta et al. 2013: 4; Erlandson, Braje 2013: 3). To such projects belong large-scale, multidisciplinary excavations of sites with a long-term occupation history.

2. DIACHRONIC CHANGES IN THE OCCUPATION OF THE MODLNICA HILL

Thanks to the excavations conducted in 2008-2010 on an area of over 26 hectares in Modlnica, site 5 (southern Poland, on the north-west outskirts of Cracow agglomeration – Fig. 1), and the release of two monographs by the Cracow Team for Archaeological Supervision of the Motorway Construction (Kruk, Zastawny 2011; Dziegielewski, Szyber and Dziergielewska 2015) one can trace changes in landuse patterns on a vast loess hill over the last 7.5 thousand years.

From the articles gathered in both volumes emerges a fascinating story of a place lying on the watershed between two Jurassic watercourses (Wedonka and Sudol), with a stunning view southwards over the Vistula river valley (including today the city of Cracow) and the remote ranges of the Beskidy and Tatra mountains, belonging to the West Carpathians. The function of this loess hill changed over the millennia, but the residential and agricultural use prevailed. When the first farmers (the Linear Band Pottery culture) settled this place about 7500 years ago, the area was probably covered with primary timber (the Atlantic deciduous forest, cf. Wasylikowa et al. 1985 for the nearest palynological reference), interspersed by many small, closed suffusive depressions (‘wymoki’), originating from the times of loess cover formation in the early Holocene (cf. Konecka-Betley, Maruszczak 1993; Kołodyńska-Gawrysiak et al. 2013). Many of them were revealed and studied during the excavations (Fig. 2; Kruk, Zastawny 2011, map 1B) (1). After the initial deforestation, those depressions became reservoirs of standing water, constituting one of the advantages for living on the watershed. As the GIS analysis of potential watercourses (based on today’s surface relief) has shown, the closed depressions must have played a significant role in the water supply for the hill inhabitants in the past, because many settlement clusters were located quite some distance from any watercourse (Korczyńska, Dziergielewski 2015, fig. 2).

During almost the entire Neolithic, Bronze Age, and Early Iron Age, up to ca 300 B.C., small settlements or groups of farmsteads functioned in various parts of the hill (Kruk, Zastawny 2011, map 1; Dziegielewski 2015, fig. 2). One can identify as many as 12 settlement episodes during this 5 thousand year period. Their remains are traces of farmsteads, visible in the form of clusters of post buildings or log-houses, storage pits, and production pits. They represent virtually all of the archaeological entities distinguished for southern Poland, from the first farming cultures (the Linear Band Pottery and the Malice cultures), through the Mierzanowice culture of the Early Bronze Age, to the Lusatian culture of the Early Iron Age (Czerniak 2010; Dziegielewski et al. 2011; Grabowska, Zastawny 2011; Zastawny, Grabowska 2011; Zastawny et al. 2011; Górski 2011; Dziegielewski 2015).

The permanent occupation and deforestation must have, over the millennia, led to a severe, human-induced lowering of the groundwater level. The long-lasting presence of ploughed fields decreased the retention capacity of the hill, which not only started to stop less and less water, causing the drainage of
Fig. 1. Location of the excavated area in Modlnica (white line) within the watershed between two streams (Wedonka and Sudoł), north-west from the city of Cracow. Pale-grey streams represent potential (reconstructed) watercourses (according to Korczyńska, Dziegielewski 2015, fig. 2, altered).

Fig. 2. One of the suffusive closed depressions (top parts) in course of the excavations (according to Dziegielewski et al. 2011).
small watercourses, but also accelerated downslope erosion, leading to the silting of closed depressions and eventually to their disappearance from the landscape by the beginning of the Subatlantic chronozone (ca 500 B.C.). Such a date can be proposed on the basis of the chronological analysis of artefacts found in the upper parts of their fills (Fig. 2). Decreases in the number and size of farms may be considered to be related to those processes (Fig. 3). At the dawn of the Neolithic (ca 5500 B.C.) there were at least 10 long houses along with more than 10 other clusters of features scattered across the hill (Kruk, Zastawny 2011, map 1A). The number of later Neolithic farmsteads varied, but the tendency was generally a diminishing in size and number (Fig. 3). After the 3rd millennium B.C., when the hill was used in another way (mobile herding strategies performed by the Corded Ware culture societies) and probably not ploughed for some time, the size of residential area rose again in the Early Bronze Age, to gradually shrink towards the Iron Age (Fig. 3). By the end of the Early Iron Age (c. 500-300 B.C.) the occupation of the Modlnica watershed was already limited to just two small farms on the western and eastern fringes of the hill, located close to the existing watercourses of the time and not to the – already fully filled – depressions. It is worth noting that during the whole period when the Modlnica hill was used as a place of habitation, the area was also used for agricultural purposes, based on the high quality soils. The homesteads, at least in the Bronze Age, were always established along the borders of the best soil (chernozhem) plots, which were usually also well insolated and visible from the houses (Korczyńska, Dzięgielewski 2015).

Later, during the first centuries of our era (the Late Roman Period, A.D. 250-400), activities other than occupation took place on the Modlnica watershed. Large clay-pits, probably exploited to meet the needs of potteries operating by a nearby settlement at Modniczka (Byrska-Fudali, Przybyła 2012), were located on the western slope of the Modlnica hill (Dzięgielewsk, Dzięgielewski 2015). However, scarce loose finds from this period, such as wheel-made potsherds, were scattered over the whole area, suggesting its use as arable or pasture land as well. No evidence for homesteads was found. In the younger segment of the Early Middle Ages (11th-12th c. A.D.) the watershed was still unfriendly for settlement and became used

Fig. 3. Diachronic changes in the number and size of residential clusters in Modlnica. Notes: the datings of particular settlement phases was adjusted into 300-year time periods; 0 marks the presence of features of other than residential type (graves, clay-pits)
as a necropolis (Sztyber 2015). The genesis of the contemporary Kraków-Olkusz route, running across the ridge along the N-S axis should probably be sought in this period (if not earlier). The centuries-old tendency to exclude the area from occupation was crowned in recent times with the location of a major motorway junction (a part of the Cracow ring), which – by the way – made our excellent archaeological insight into the whole area possible.

3. REASONS FOR THE CHANGES

Although many cultural or ecological factors, such as depopulation, changes in subsistence mode (e.g. mobile herding in the Late Neolithic), the impoverishment of soils, or even the natural Holocene climate variability (e.g. Mayewski et al. 2004), might have had impact on local conditions, making the hill favourable or not for establishing homesteads, one must notice that the main factor was the activity of man himself. The evidence is delivered i.a. by the analysis of the fills of the closed depressions, which completely disappeared before 500 B.C., i.e. in the beginnings of the Iron Age. Both the lowering of the groundwater level due to permanent deforestation and the increasing rate of surface erosion due to the long-lasting ploughing led to the depletion of water sources in the discussed area (cf. Korczyńska, Dziegielewski 2015, fig. 3). The gradual reduction in the number and size of settlement clusters (farmsteads) towards the Iron Age, as well as the renouncement of the residential character of the place after some hiatus between 300 B.C. and 250 A.D.(2) seem to have been related with those processes. The habitation areas were at the same time pushed closer to river banks (e.g. the Modliniczka settlement dated to the Pre-Roman and Roman periods, located just upon the Wedonka river – Byrska-Fudali, Przybyła 2012; Dziegielewka, Dziegielewski 2015, fig. 3).

The increasing number of similar scenarios of diachronic changes within upland areas convinces us that the story is quite typical for the last few thousand years, the era of increased human impact on the environment. One may even wonder if the trend to settle the areas along rivers, usually in lower parts of their valleys, observed in the last two centuries before and first two centuries of our era (cf. Rodzińska-Nowak 2012: 31-35, 50-51), was to some degree also connected with those processes (i.e. with anthropogenic groundwater lowering on higher locations).

4. TOWARDS THE ANTHROPOCENE: THE ROLE OF THE IRON AGE

The occupation history of an unpretentious loess hill near Cracow offers a good opportunity to express some general observations. The critical moment when the local landuse pattern changed due to the cumulative effects of earlier, human-induced transformations, came at the start of our era, or ‘the mature Iron Age’. It coincided with a period of significantly increased anthropogenic pressure across Europe and some other areas of the world (cf. Kaplan et al. 2011; Starkel et al. 2013). This pressure is best exemplified by phenomena such as the increased share of cultural indicators in pollen spectra (e.g. Tinner et al. 2003, fig. 5; Makohonienko 2004; Nalepka et al. 2005: 117-120, figs. 17-18), the increasing transformation of natural land cover (Ellis 2011; Ellis et al. 2013; Ruddimann et al. 2016, fig. 9), the acceleration of the energy flows in rivers (increased sedimentation rate) (Kalicki 2006; Hoffmann et al. 2007), or the global increase in anthropogenic soils formation (Certini, Scalenghe 2011). Of course, in some areas the human impact (deforestation, erosion) was significant (or sometimes even destructive) already in the Neolithic, as shown by the case of the southern Poland loess uplands in the times of the Funnel Beaker culture (4th millennium B.C.) (Kruk et al. 1996; Nowak 2014; Chmielewski et al. 2015). Also during the Bronze Age (2nd or 1st millennium B.C.) serious modifications of the environment took place in some regions (e.g. Latalowa 1997; French 2010). However, more permanent anthropogenic changes in geo- and ecosystems
were only connected with advent of the Iron Age. In Europe such pressure was first exerted in the South (the Mediterranean) in the late 2nd millennium B.C. (e.g. Butzer 2005; Zanchetta et al. 2013), then started to be noticed around the Alps (Tinner et al. 2003, fig. 5), reaching the temperate and northern zones of Europe in the first centuries A.D. (e.g. Dobrzańska, Kalicki 2004; Nalepka et al. 2005: 120; Singer 2007; Starkel et al. 2013). It can be associated with the spread of the socioeconomical and technological inventions of the Iron Age (political economy, social organisation of labour, ever more extensive use of iron tools), and obviously with demographic growth (cf. Kristiansen 1998: 290-358; Pare 1999; Dotterweich, Dreibrodt 2011, fig. 2)(3).

Perceiving the onset of the mature Iron Age (varying from 800 B.C. to A.D. 100 across regions of Europe) as one of the nodal points in the increasing trend of human impact on the Earth’s systems (especially on the lithosphere, hydrosphere, and biosphere) has a rich tradition in geoscience, exemplified by such terms as ‘human-made’, or ‘anthropogenic’ landscapes (Hoffmann et al. 2007; Kaplan et al. 2011; Starkel et al. 2013). In the ongoing attempts to position the onset of the Anthropocene on the timescale (e.g. Crutzen 2002; Ruddimam 2003; Smith, Zeder 2013; Ruddiman et al. 2016; summary in: Zalasiewicz et al. 2015), the date around 1 A.D. has already been invoked, e.g. in the context of the mass appearance of the ‘anthropogenic soils’ (Certini, Scalenghe 2011). Although fixing the global onset of the geological Anthropocene in the mid-20th century seems most justified in terms of stratigraphy (Zalasiewicz et al. 2015; Waters et al. 2016), I would nevertheless argue to not overlook the importance of the boundary before and around the turn of the common era (from ca 800 B.C. to 300 A.D., depending on region). The importance of the Iron Age boundary is worth underlining, as it has sometimes been neglected even by archaeologists themselves (e.g. Erlandson, Braje 2013: 6).

Similarly to the Industrial Revolution or post-war ‘great accelerations’, this Iron Age ‘acceleration’ fits well into the concept of the stepwise formation of the stratigraphically identifiable Anthropocene, which was recently described as the period of ‘Palaeoanthropocene’ by S.F. Foley et al. (2011). This may seem quite a long segment of time for a ‘step’, but in fact for many major ‘revolutions’ it took time to affect broader areas. Stages of similar range were also recognised by B.D. Smith and M.A. Zeder who, using the criterion of the ‘first significant human niche construction’, saw the onset of the Anthropocene at the moment of the initial domestication of plants and animals at 9000-7000 B.C. (i.e. parallel to the onset of the Holocene) (Smith, Zeder 2013: 9). They regarded the Anthropocene (just like Palaeoanthropocene was seen by Foley et al.) as a period of gradually raising human agency rather than a geological epoch sensu stricto.

5. CONCLUDING REMARKS

The breakthrough in the field of human impact on Earth’s systems that occurred in the days before the end of the previous era and at the B.C./A.D. boundary is part of a whole series of other changes mankind then experienced: fundamental changes in technology (iron), or in political, social and mental spheres (the Jaspers’ Axial Age, when most modern philosophical notions were born). Despite its far-reaching consequences for Western civilisation, this stage would be of regional importance in some sense, as the Iron Age was not a global occurrence.

Setting the results of the Modlnica research within the global scheme of the ‘anthropogenic era’ serves several purposes. It gives a new conceptual frame to our studies on man-environment relations in late prehistory (from the Neolithic on), but also allows us to include regional archaeologies into the description of long-term (and still ongoing), global processes of change. It may help to communicate to the public that today’s struggle for sustainable economy makes sense precisely because of the ancient age of environment devastation. It can also draw attention to problems other than that of greenhouse gas emissions, which seems well recognised in popular media, and which are connected with global change, such as soil erosion or the human impact on biomes. However, when discussing the increasing role of
man in how Earth's systems work we should still bear in mind that even our contemporary society remains strongly dependent on – and vulnerable to – natural (e.g. climatic, lithospheric) effects, and therefore not to overestimate our role.

NOTES
[1] Only selected closed depressions, mainly from the eastern part of the site, were plotted on this map.
[2] The hiatus itself not had only a local nature, but was connected with broader socio-cultural changes which Malopolska Iron Age societies witnessed at that time (cf. Godłowski 1985: Grygiel 2004; Dzięgielewski 2015).
[3] Many authors claim that some of these occurrences (political economy, long distance trade, warrior aristocracies) appeared already in the Middle or at least Late Bronze Age, i.e. in the 2nd millennium B.C. (e.g. Earle, Kristiansen 2010). I would agree, but nevertheless argue that it was not before the Iron Age that those phenomena reached sufficient scale and impact, mostly due to demographic growth.

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FROM THE INDUSTRIAL LANDSCAPE TO THE ONE OF RELIGIOUS NATURE – TRANSFORMATIONS OF THE "WHITE SEAS" IN THE ŁAGIEWNIKI-BOREK FAŁĘCKI DISTRICT IN KRAKÓW

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ABSTRACT
The discovery of deposits of shale clays and gypsum in the 19th century resulted in the development of industry in the village of Łagiewniki, which had been mainly agricultural until then. In 1906, the B&W Liban Factory of Chemicals in Podgórze launched the production of soda. The "Solvay" Soda Plant in Krakow operated until the 1990s and was dominant in the landscape of this part of the city. It was officially closed in 1990. Over time, the area, which had been extremely degraded by industrial activity, became subject to reclamation, transformation and development with functions far from religious ones, and in 2007 part of the area owned by the city was handed over for the construction of the emerging St. John Paul II Centre. A new pilgrimage centre, i.e. the Shrine of St. John Paul II, which has been operating within St. John Paul II Centre since 2012, was located on the reclaimed brownfields. In this way, a new and important religious pilgrimage centre began to develop far away from the centre of Krakow. Over three decades, the industrial and post-industrial landscape in the eastern part of the former Solvay factory has changed its nature and function, and along with the Shrine of the Divine Mercy it forms a multi-function pilgrimage area. The aim of this study is to present the transformations of the "White Seas" in Krakow's Łagiewniki-Borek Fałęcki district in the last one hundred years. Particular attention was paid in the study to the factors and conditions of changes occurring in the use of this space, and the consequences and threats stemming from them were highlighted.

Keywords
Pilgrimage center, industrial landscape, 'White Seas', Kraków

1. INTRODUCTION (ARIAL 8 CAPITALS, LINE SPACING 1.5 LINES, LEFT CENTERED)

The discovery of deposits of shale clays and gypsum in the 19th century resulted in the development of industry in the village of Łagiewniki, which had been mainly agricultural in nature until then. In 1906, the B&W Liban Factory of Chemicals in Podgórze launched the production of soda. The "Solvay" Soda Plant in Krakow operated until the 1990s, and was a dominant feature in the landscape of this part of the city. It was officially closed down in 1990.

At the beginning of this century, the construction of a new religious complex, i.e. the John Paul II 'Be Not Afraid' Centre of worship and remembrance of the Pope, began in the immediate vicinity of the Shrine of Divine Mercy in Krakow. Both shrines are located in the southern part of Krakow's Łagiewniki-Borek Fałęcki 9th district (Fig. 1).
This district consists of two old villages adjacent to Kraków, i.e. Łagiewniki and Borek Fałęcki, which were included in the city limits in 1941. Thus, a new, important religious pilgrimage centre began to develop far from the city centre. This comprehensive pilgrimage centre was established in unused, former industrial areas of the Solvay soda chemical plant. It was in this way that a neglected post-industrial area became one of tourist reception, and a place of important cultural and religious events. The religious centre consists of numerous religious facilities, also performing other functions, among others, cultural and educational ones. The pilgrimage centre in Krakow-Łagiewniki is an important entity in the development and promotion of the city's tourism, and its potential has been increasing rapidly.

The aim of this study is to present the transformations of the "White Seas" in Kraków's Łagiewniki-Borek Fałęcki district in the last one hundred years. Particular attention was paid to the John Paul II Centre, a new pilgrimage centre in Krakow, which was built in a post-industrial area. The spatial organization of this new centre and its potential for pilgrim movement have been described.

2. THE JOHN PAUL II CENTRE, ITS ESTABLISHMENT AND SPATIAL ORGANIZATION

The establishment of the centre was affected by historical and religious conditions. The assumptions of the urban policy regarding the development and valorization of post-industrial areas were also significant. The Pope's personal relationships with the shrine in Łagiewniki were also important. We can say that

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Fig. 1. Pilgrimage centre in Krakow-Łagiewniki. After: Liro 2014 revised.
if it was not for the worship of God's Mercy in Łagiewniki, the John Paul II Centre would not have been established in this place. In addition, the Shrine of John Paul II is located in the reclaimed post-industrial areas of Krakow's 'Solvay' Soda Works. The discovery of deposits of shale clays and gypsum there, in the 19th century, resulted in the development of industry in Łagiewniki, which had been basically agricultural in nature until then. In 1906, the B&W Liban Factory of Chemicals in Podgórze launched the production of soda ash and caustic soda. In 1921, it was taken over by the Belgian company Solvay. Karol Wojtyła worked in this plant in the days of the Nazi occupation (Sroczyński, 2008). It was then that he often visited the nearby monastic chapel. Krakow's "Solvay" Soda Works operated until the 1990s, and were a dominant feature in the landscape of this part of the city (Fig. 2) (Jackowski & Soljan, 2010). In 1990, the works were officially closed, and spontaneous regeneration and natural succession occurred during the first years to follow, as a result of which a vast, over 100-hectare, green complex developed (Sroczyński, 2008: 429).

Extremely degraded by industrial activity, with the passing of time, the area became subject to reclamation, transformation, and development with functions far from the religious ones, and in 2007 part of the area belonging to the city was handed over for the construction of the emerging John Paul II Centre. The decree establishing John Paul II Centre was signed on 2 January 2006 by the Archbishop of Krakow, His Eminence Cardinal Stanisław Dziwisz, a little over half a year following the Pope's death. The choice of Krakow, Karol Wojtyła's city, was evident, and his relationships with the cult of Divine Mercy and Łagiewniki certainly had an impact on the specific location of the Centre. Still in 2006, during his pilgrimage to Poland, Pope Benedict XVI blessed the foundation stone for a future church dedicated to John Paul II, and on 11 October 2008 the construction of the structure was started. The Sanctuary of Bl. John Paul II was founded by cardinal Stanislaw Dziwisz on June 11, 2011. On the same day, the relics of the Holy Father were placed in the chapel, and this date is considered as the official beginnings of the cult of Bl. Pope John Paul II in the new sanctuary. The core, or the main sacred site, of St. John Paul II sanctuary is a chapel dedicated to him, in which the relic of the Pope's blood is kept in the main altar. John Paul II's tombstone, coming from the Vatican Grottoes of St. Peter's Basilica in Rome, was placed in the Priests' Chapel. Among the many mementoes in the sanctuary there is also the papal pastoral cross, mitre, and chasuble. Many structures also have a symbolic dimension, e.g. the Priests' Chapel which was designed to resemble St. Leonard's crypt at the Wawel castle, where the Pope celebrated his first Holy Mass. John Paul II Square refers with its dimensions to the Market Square in Wadowice and the Dębnicki Market Square in Krakow. Indeed, the landmark features of 'White Seas' did have an impact on the spatial assumptions behind the complex. The area is raised above the surrounding countryside, and is beginning to constitute a dominant feature in the landscape of southern Krakow. In the architectural design, the location of the John Paul II Centre was highlighted by giving it the name of 'a Holy City On A Hill' (Mikulski, 2008). The distribution of all facilities of the Centre is characterized by spatial continuity. They are focused around the most important site, i.e. St. Pope John Paul II's sanctuary church. The complex includes many other structures, among others John

Fig.2. ‘White Seas’ in the late 1980s. After: materials of the John Paul II Centre.
Paul II Museum, John Paul II Institute, Conference Centre, Volunteer Centre, Meditation Park, open-air chapels referring to the Pope's encyclicals and pilgrimages to his homeland, an observation tower, and accommodation facilities (Fig. 3). An additional element is a steel bridge (a former technological bridge of the Solvay factory), from the times when the Pope worked in this place, left in its original location. The whole complex, according to the concept adopted by its creator, is compositionally subordinated to the Shrine of Divine Mercy.

The pilgrimage centre established by the Shrine of Divine Mercy and the John Paul II Centre constitute a whole in terms of space and landscape, marking the largest sacred zone in the city. Both layouts are separated, or perhaps linked, by the Wilga river. Apart from it (and the depression associated with the river), there is no clear, sharp boundary between them. This is due to the similar structure of the sacred zones within each shrine and the location of sanctuary structures in large, open space. The prayer park constitutes a natural passageway, a direct walkway connecting the two layouts. The architectural solutions of both complexes refer to the solutions used in the largest modern pilgrimage centres. Only the architecture and style of the buildings erected can be some dissonance here. In total, the sanctuaries alone occupy several hectares and, taking into account the adjacent urban areas where post-soda waste from the former Solvay was once stored, and where a large park with an area of approx. 10 hectares is to be created, the complex will be one of the world's largest layouts with the dominant religious function. A confirmation of the role that this complex plays in the spatial and functional structure of the city is the fact of putting the ‘Development of the area around the Shrine of the Divine Mercy and the John Paul II ‘Be Not Afraid’ Centre’ project on the list of investment projects supporting Krakow's metropolitan functions (Nowacka-Rejzner, 2008).

3. THE POTENTIAL OF THE KRAKOW-ŁAGIEWNIKI PILGRIMAGE CENTRE

The religious potential of the sanctuary centres discussed is difficult to overestimate. The geographical proximity of the two centres only increases these opportunities, and the immediate vicinity of the Shrine of Divine Mercy is especially advantageous for the John Paul II Centre, which is still in the phase of construction. As a result of the development of the cult of Divine Mercy and the worship of St. Faustina, the monastic religious centre in Krakow-Łagiewniki was transformed into an international pilgrimage centre, which is annually visited by approx. 2 million pilgrims.

The whole is intended to form a homogenous sacred zone symbolically linked to the cult of Divine Mercy and the figure of St. Pope John Paul II. Besides the spatial determinants, both shrines show strong thematic relationships. They share not only the location, but above all, the figure of St. Pope John Paul II. An important element holding the two sanctuaries together is also their primary function, which consists in providing pastoral care for arriving pilgrims. Joint activities in this field are all the more possible since the
two sanctuaries are under the authority of the Archbishop of Krakow. Joint activities are also extorted by pilgrims themselves who, during their stay in Łagiewniki, often visit both the Shrine of Divine Mercy and the Sanctuary of John Paul II. Today, Łagiewniki belongs to the most important pilgrimage sites in the world.

The city authorities are aware of benefits that the functioning of the pilgrimage centres of this scale can bring. The city has handed over the area called 'White Seas' with the aim to construct the Sanctuary of John Paul II there in the future. Changes to the city's development strategy aimed at activating the areas around the shrines and providing them with transport accessibility were also made.

From the point of view of developing pilgrimages and tourism, the most important subjects are the pilgrims and tourists arriving there. The Shrine of Divine Mercy and the John Paul II "Be Not Afraid" Centre are a new tourist and pilgrimage centre in the space of Krakow, visited by over 2 million people each year, including approx. 500,000 pilgrims from over 100 countries.

The religious and cultural potential of these shrines certainly provides an opportunity for the further development of pilgrim and tourist movement. To achieve this, however, close cooperation and coordination of activities of all parties are necessary with regard to the Shrine of Divine Mercy and the John Paul II Centre, which are sacred pilgrimage layouts of international importance. Both sanctuaries mark Krakow's new religious centre, and their emergence has caused far-reaching changes in the structural and functional organization of Łagiewniki-Borek Fałęcki district within its limits (Soljan, 2012). The Shrine of Divine Mercy with the John Paul II Centre constitute a complex sacred zone affecting the urban space. These sanctuaries are important entities in the activities of the city of Krakow undertaken for the promotion and development of tourism. The religious and cultural potential of these centres provides an opportunity of further development of pilgrim and tourist movement (Soljan & Liro, 2014). To achieve this, close cooperation and coordination of activities of all parties interested in the development of religious tourism in the city are necessary (Liro, 2014).

4. CONCLUSIONS

Over time, the area, which had been extremely degraded by industrial activity, became subject to reclamation, transformation, and development with functions far from religious ones, and in 2007 part of the area owned by the city was handed over for the construction of the emerging St. John Paul II Centre. A new pilgrimage centre, i.e. the Sanctuary of St. John Paul II, which has been operating within the St. John Paul II Centre since 2012, was located on the reclaimed brownfields. In this way, a new and important religious pilgrimage centre began to develop far away from the centre of Krakow. Over three decades, the industrial and post-industrial landscape in the eastern part of the former Solvay factory has changed its nature and function, and along with the Shrine of the Divine Mercy it forms a multi-function pilgrimage area.

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GREAT WAR IN MOUNTAIN LANDSCAPE: CASE OF ITALIAN DOLOMITES

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ABSTRACT

During the First World War several rocky areas were adopted and used for military purpose. In 1915 the Austrian army reached the Dolomites, as the neutral Italy declared war to the Austrian-Hungarian Empire. The military high command feared that bypassing the Alps the Italian army could reach the capital city of Vienna in just one week, so it was decided to secure the most important routes and mountain passes in the region. One of these strategic locations was the 2,105 m high Falzarego Pass, connecting the Valle del Boite with various other valleys of the Dolomites. This pass is overlooked by the nearly vertical cliffs of the small Lagazuoi, a 2,700 m high mountain. There was no experience with war in such an extreme and alpine environment and it was almost impossible to attack the enemy when he took shelter above the steep cliffs of the Dolomites. This defensive system, as many others constructed during the Great War, required the construction of cave emplacements, shelters, observation posts and access roads of considerable strategic and architectural importance. Let us try to describe its context as well as its assignment and role which they played during the war and a mark left by them in landscape and memory.

Keywords
Great War, military architecture, Dolomites, war in mountains, Italy

1. ITALY IN THE FIRE OF GREAT WAR

The First World War was very different from any previous conflicts. Huge amount of soldiers, military equipment and munitions made it simply unimaginable before it actually occurred in 1914. It marked all involved countries as well as every soldier, civilian or refugee life in such a memorable and devastating way, full of consequences, that it is precisely because of its terrible, unexpected and unique nature. That is also a reason why this chapter in worlds modern history is so difficult to tell and also to research.

Special attention should be directed on to fights and battles which took place in mountainous regions because they were excessively burdensome and brought a lot of victims (Nicolle 2003: 8-11). The events which occurred in the Italian mountains areas may serve as a good example of such research. The war in the Ladin, Trento and Tyrol valleys which belonged to the Austro-Hungarian Empire began in August 1914. It was a month after the Archduke Franz Ferdinand, was assassinated in Sarajevo. Shortly thereafter all men between 21 and 42 years of age were called to arms and sent to the front, convinced that they would return home safe and sound after a very quick military campaign against rebellious Serbia. Among these groups formed into the “Kaiserjäger” were also many soldiers from the Ladin valleys that were sent to Galicia, the Russian Front, and the Balkans. Contrary to the initial expectations - earlier than the month of December 1914 - the Austro-Hungarian Army had lost almost half of the fighting force and potential. Unfortunately many others soldiers perished after that time. Also on the infamous mountain front lines which were known for the extremely high number of tragedies and the failure of many plans and strategies
which were always practically decimated. It is worth underlining that Keiserieger regiments, grouped in XIV Army Corps, 3 ID, played key role in stopping Russian ‘steamroller’ during the Battle of Krakow and Limanowa- Łapanów. Preventing the Moravia and Silesia from being captured by the tsaris troops (Bator 2008: Gawlik and Czarnowicz 2015).

In the first part of the Great War the well-known policy of the “interventionists” prevailed in Italy and efforts were intent on “liberating” Trento and Trieste from the foreign shackle of Austrian-Hungarian empire. On 23 May 1915, just after signing the London Treaty and nullifying its alliance with the Central Powers, Italy declared war on Austria-Hungary. This event created a new southwestern front formed from the Stelvio Pass to the Carinthian border. At the same time Austrian troops were engaged against the Russian offensive. Austro- Hungarian military command was trying to prepare themselves for the possibility of opening a new front. Italian propaganda slogan, repeated by the survivors of bloody Battles of Isonzo - “for Trento and Trieste” (Thompson 2008:95-99) underlines the aims of the new enemy plans. The border between Kingdom of Italy and Austro-Hungarian Empire run through Alpine and Dolomite peaks and valleys leaving only small space at the South-Eastern end for maneuver combat.

Knowing its military value Austro-Hungarian Highest Command started to prepare the defense line far before the outbreak of the Great War. But unfortunately most of the available budget was spent for building an modernization of the two biggest strongholds of Galicia – Kraków and Przemyśl in preparation for the expected war with Russia (Thompson 2008: ). The limited budget allows them to build a small number of forts such as Tre Sassi fort on the Valparoa pass in order to secure the key positions allows them to block the attacking enemy. With the outbreak of war whole project gained momentum. The fortification of the new front and its defense in case of Italian attack was in hands of newly formed Landesverteidigungskomando Tirol (Jung 2003: 12). With the Italian attack on the positions in Alps and Dolomites a new kind of warfare was born. For the first time in human history war was to be fought in so far inaccessible regions such as highly elevated mountain passes.

Despite the fact that the Tyrolean members of the rifle association’s were given the army’s numerical inferiority (“Standschützen”) they had received no formal military training and were primarily young boys and the elderly because all other men had already been drafted into the forming regular army (Nicolle 2003: 13-21). They were tasked to stop the enemy. It is worth to mention that soldiers from Ampezzo and Colle S. Lucia were one of the most reluctant to leave their homes and families for the most convenient positions in the mountains, where it would have been much easier to face the Italian army. They probably knew that defending the Ampezzo and Colle S. Lucia basins which were open towards the south, would be not possible and the Italian army will soon occupy their villages. On the other hand, the valley of Livinallongo, which fell on the frontline, was completely evacuated and abandoned. Many women, elderly and children from Livinallongo fled to the unknown. Some of them even reached Bohemia, taking with them only what was strictly necessary. Soldiers who were capable to fight remained to defend their homeland.

The “Schützen” from Livinallongo and Ampezzo that were grouped into the 4th company of the Enneberg Battalion under the command of Major Franz Kostner from Corvara. Together with the Standschützen from Val Badia (2nd and 3rd companies) and those from Bruneck (1st company) were dislocated to the front from Passo Pordoi to Travenanzes until a few months later when the elite German Alpenkorps arrived as reinforcement. Most of the Ladin Schützen troops were subsequently concentrated on the front of Col di Lana until the defeat at Caporetto (Jung 2003: 4-7).

The Austrian military boundary on the Dolomites were connecting the mountain peaks into an shape of amphitheater formation. It extended from the Lagorai to the Monzoni mountains; from the Marmolada and the Padon to the Col di Lana and the Settsass; from Lagazuoi to the Tofanes. The intervals along this natural rock-line of defense were established by old fortresses that had lost much of their military protection, such as the “Corte” fortress and the “Ruaz” which barricade in the Cordevole Valley and the “Tra i Sassi” fort on the Valparola Pass. The significantly inferior numbers in the Austrian defense would certainly have allowed the Italian army to easily overcome the Dolomite passes and conquer the area as
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far as Brenner. However, the General Cadorna anticipated that the decisive battle would soon be fought on the Isonzo River. Looking strategically the Tyrolean front was treated as of secondary importance and, consequently, the Italian army postponed its quick attack for this reason. This delay was very important and gave the Schützen enough time and space to reinforce their defensive lines (see eg. Kegan 2001; Page 1920).

On May 29, 1915, the Italian troops reached Cortina d'Ampezzo and Colle S. Lucia without a single shot being fired but soon thereafter, on July 8, the army failed its first great attack against the Son Pouses defensive posts on the high mountains of Cortina. On July 5, the 4th Italian Army was mobilized from the Col di Lana to the Tofanes for the great offensive that was to begin in the next two days. On July 17, the troops fighting for the Col di Lana peak ended roughly where it had begun. In this way hopes of quickly advancing forward disappeared and slow, extenuating trench warfare soon set in that did not move forward even with the explosion of numerous mines by the Italian and Austrian sides of frontline. The Col di Lana peak was mined and it exploded the night between the 17th and 18th of April 1916; on July 16 of the same year, the Castelletto peak exploded. Both events were carried-out by the Italian offensive. Likewise, the Austrians detonated several bombs on the Lagazuoi to dislodge the Italians clinging to the Cengia Martini. However, nothing turned the course of the war, not even the famous punitive expedition staged by the Austrian army from the Trentino (Strafexpedition) during May 1916 (Jung 2003: 4-7).

The most aggressive battles have place on the Col di Lana. It was perfect strategic location and it was one of the most insurmountable obstacles for the Italian advance into Val Cordevole, Val Badia and Val Gardena. The cold winter between 1916 and 1917 was the most lethally inflicting period of all sides of conflict. Both soldiers and the civilian population began to suffer from terrible hunger and at least 10,000 people died because of the extreme temperatures caused by persistent snowfalls and also in avalanches. In order to survive the natural calamities and as well as the enemy fire of the Austrians, the Austrian engineer, Leo Handl, designed a huge series of tunnels cut inside the mountains and deep into the Marmolada Glacier at over 3,000 m of altitude. Soldiers who carved and drilled into what ultimately grew into a network of several kilometers made a real “under ice city”. However, the superhuman efforts made by them did not significantly improve the tactical situation of Italian army (Page 1920: XV).

October 1917 gave the Italian army’s disastrous defeat at Caporetto and its eventual retreat into the distant Piave River. To reinforce the lost frontline the Italians withdrew all their soldiers from the Dolomites farther south, to the region near Monte Grappa. The disintegration of the Habsburg monarchy was swiftly nearing in October 1918. Horrific hunger, permanent equipment and munitions shortages and disheartened soldiers coincided with a definitive crisis in the multinational Austrian-Hungarian army. In the morning of October 29, Italy launched its very final, victorious offensive operation and a cavalry column rode into the town of Vittorio Veneto. The Austrian high command was forced to accept the conditions of the armistice which was signed on November 3, 1918. These tragic memoirs associated with the mountain war should not diminish the tragic absurdity of the stationery trench warfare fought on these unforgiving high area that viciously create misery and victims on both sides of conflict (see eg. Kegan 2003).

2. THE NEW ART OF WAR

Nobody expected that at the beginning of XX century, in the century of scientific discoveries and rapid development of technology at the highly elevated positions in Alps and Dolomites trench warfare will evolve to ‘troglodytic warfare’. The hallmark of this process are the installations in the area of Cortina d’Ampezzo where since the summer of 1915 heavy fights took place. Remains of large stone build fortress as same as human made caves dwellings, tunnels and trenches are still visible in the landscape of the area.

Austro-Hungarian forces had abandoned the Cortina d’Ampezzo region hiding behind the fortress of Tre Sassi blocking the passage to Val Badia and Pusteria Valleys. Italian Army was trying to cross
the Valparoa Pass in order to continue the advance to Tirol. Valparoa pass located approximately 2168m a.s.l. is continuation of the Falzarego Pass leading westwards from Cortina d’Ampezzo. It is surrounded by the hills around 2700 m a.s.l. and getting narrower towards West. From the North its edge is marked by the Tofane mountain group with peaks such as Lagazuoi (2853m a.s.l.) or Cima Falzarego (2563m a.s.l.). From the south the border is marked by the Sasso di Stria (2477m a.s.l.) and Cinque Torri (2252m a.s.l.). Between the 1897 and 1901 a fortress was built by the Austro-Hungary to block the pass and to close the way to Southern Tyrol via Val Badia. Tre Sassi fortress, as it was called, was built as a part of the larger complex of the Habsburg Empire southern border fortifications. It takes position at the highest and narrowest part of the Valparoa Pass between Piccolo Lagazuoi and Sasso di Stria. Later in 1911 it was modernized (WWI Bridges website). Fortress was equipped with two 8cm M98 and two 6 cm M98 guns and four machineguns. The building was erected using large blocks of stones Observation and directing of artillery bombardment was able thanks to an observation point in the observation dome at the roof (Wachtler and Obwegs 2004: 47; Vianelli and Cenacchi 2006: 175). The fortress was
knocked out by the Italian artillery, firing from the area of Cinque Torri, on the 5th of July 1915. 210 and 260 mm shells penetrated the roof. After the abandonment of the fortress Austrian troops were visiting the fort to turn the lights so Italian still believed that fort is operating. Italian advance was stopped. The area...
Fig. 5. Castelletto gallery – generators room (Bassetti Silvano in Grande Guerra 1915-1918).

Fig. 6. Ice tunnels in Marmolada gallery - Museo Marmolada Grande Guerra.
under discussion will remain as a theater of mountain fights till the late 1917 when after the disaster at Caporetto Italian army was forced to retreat. Austro-Hungarians prepared also a positions at the slopes of the nearest to Tre Sassi hills. This lines were hard to bypass but Italians found the way to drive between the enemy lines. They lunched an assault at Picolo Lagazuoi finding the ledge facing toward the Valparola Valley not taken by the Austro- Hungarian Forces. This position, called after the name of the commander

Fig. 7. Ice tunnels in Marmolada gallery - Museo Marmolada Grande Guerra.  

Fig. 8. Passage in Lagazuoi.  
http://www.avventurosamente.it (Access 15.08.2015).
of the unit which found the position as Martini Ledge (Cengia Martini), allows Italians to fire against the enemy positions at Valparola. It was a real thorn stuck in the position of Austro-Hungarian troops who sought every opportunity to displace an opponent with Piccolo Lagaouzi. But soon both sides find out that only way to conquer the enemy’s positions was to bow them up. This lead to a tunneling war. Both sides bring to the front a legions of engineers to in order to carry the mining operations. Italians started to prepare the positions at Cinque Torri which become the artillery headquarter form where artillery bombardment was directed. They dug special positions for the guns and pathways for the logistics such as for e.g. ammunition transport. Its enemies started to dig tunnels to build shelters for the units fighting near summits, HMG nests and checkposts. All such rock cut chambers were connected by the passageways. Such operations turned the mountains into underground castles. At this point the images tell a lot more than words, presenting the results of the work of engineer troops of the fighting sides. This is what has been created by young Italians, Austrians, Poles, Czechs and Hungarians do not differ in any way from the known from the beginning of civilization’s development troglodytic architecture complexes, although its function was different. If it was possible a mechanic borers and chisels were in use but in many cases enginers could only rely on their own strength and simple tools. Fortifications of the Valparola Valley and neighboring summits are a very well preserved example of the Grate War troglodytic architecture, thanks to the support from EU opened to public as the open air museum, but similar structures could be found along whole frontline in dolomites and alpine front. Sometimes, like in example of Marmolada, an chambers, shelters and other military installations were cut not only in rock but also in glacier’s ice. Outside the rocks, at the ledges and passes both enemies prepared a series of trenches very often, as in the case of the battles on the plains of Western Europe, a lines of the barbed wire were set to slow down the enemy. Traveling through dolomites even today, a hundred years after the war one can find rusted pieces of it, contrasting with the idyllic alpine landscape. Beside the shelters and positions carved in the dolomite rocks both sides developed the tunneling technique trying to make the passages leading to the vicinity of the enemy positions. The aim was to build at the end of the corridor a chamber to plant the explosives. After the execution, chamber was filled with tons of explosives and then the entrance was blocked with rubble bags what helped to directing the explosion toward the enemy positions (Thompson 2008: 208-210). Piccolo Lagaouzi survived five different explosions, four of them were done by Austrians who were trying to destroy Italian positions at Cengia Martini. The same tactic was applied in different parts of the frontline. Using the mechanical drills military engineers were able to dig approximately 5-6m per 24 hours (Thompson 2008: 208). The most tragic event happened in Col di Lana where 5 tons of explosives blown up Austro-Hungarian positions killing half of the unit defending the summit, the rest who survived the attack of Italian’s Alpine, 140 men, became a POV (Thompson 2008:210). Also tragic was the outcome of the mine detonation at Castello where similar tunnel was build. This time more attackers than defenders died. The cause of their death was carbon monoxide which covered the crater after the explosion.

The rock hewn ‘cities’ in the dolomite and alpine front become not only a place to fight but, maybe even more, the place to live for the soldiers of the fighting sides. Harsh conditions, extreme temperatures and heavy snowfalls made this are available for open combat only since late spring till the beginning of the autumn. During the inter-phases both sides limited theirs actions to patrols. While most of the soldiers remained hiding in the shelters. Regular shelter unit was a rock hewn chamber with beds, ammunition and weapon rack and stove. Other kinds such as HMG posts had also a machinegun stand and the opening in the rocks facing the enemy lines. Corridors and chambers often had a ventilation vents to provide the deep- in- the- rock units with the fresh air. During the winter months artillery was useless because projectiles get sunk in the deep snow without causing explosion (Thompson 2008: 201-214), during that time both side rely only on the small arms and their own made weapons customized to the conditions of the high altitude frontline.
3. MEN BEHIND THE WHITE WAR

Dolomites front was totally different than any other during the Great War. Only the fights in Carpathians during the winter months of 1914/1915 could be compared in terms of harsh weather conditions to the events from Marmolada, Lagazuoi or Castello. To achieve the success both commands need a special units trained it the art of mountain military operations. Austro-Hungarian army had its Keiserjegers while Kingdom of Italy was calling up men living in mountain regions of the country to for the Alpine brigades. Their duties were not only to attack the enemy abut also to establish ferrate routs – the mountain roads leading to positions high in mountains (Nicolle 2003:22).

Beside the Keiserjeger units, formed mostly from the Tyrolean citizens Austrian army used during the war in dolomite also volunteer regiments so called Stanschutzen they were formed from the loyal to Hapsburg house ‘rifle organizations’ from Tyrol and Vorarlberg (Jung 2003: 37-38). Although they were too young or too old to be call to regular army they were expert in mountain survival ale expert shooters.

Beside the ethnic Tyrolean and Vorarlberg citizens also people from different parts of Austro-Hungarian empire fought at the southern front. It was the fate of many Poles, such as the grandfader’s of one of the authors of this publication. Possibly the best know Polish soldier fighting in the Keiserjeger unit was Stanislaw Maczek. He later become the general of the Polish army leading, during the September 1939, famous 10th Motorized Cavalry Brigade and later 1 Polish Armored Division. Maczek was an officer in 2 TKJR leading, between many, 8th company a special shock troop of expert skiers and alpinists (Markiewicz and Pawłowski 2010). He was fighting in Dolomites and Asagio region.

War struggles that took place in the mountainous regions of Italy on the today’s Austrian - Italian border, brought huge human losses and left a lasting mark on the landscape as well as in the people’s memory. The study of these rocky, mountain areas are among the most difficult tasks in research programs. The same situation can be noticed in other high located areas where Great War battles were fought. An interesting example of this type of work will be eg. a new research project started during 2015 in Poland, which sought to examine the remains of the fortifications build during the first months of the Great War, in the mountainous regions of south-eastern Poland.

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ABSTRACT
The paper presents the results from a research project investigating the cultural landscape as a social construction and its perception in every-day life. It has a special focus on dynamics, actors, and cultural values around landscapes of Venice, Leipzig and Arkhangelsk. Particular attention is given to analysis of its meaning in ordinary life of citizens. Both the narrative and physical landscape patterns have been shaped by a local process of constant comparison with well-known symbols, including landmarks of regions. In particular, the paper illustrates how the landscape will be interpreted in the local dialogue of place, especially in the perceptions of its residents and tourists as reported in semi-structured interviews and participatory observations. As memory and place of belonging, a cultural landscape is not only what people see, but also a way of seeing, e.g. how people interpret it with their mind, using basic knowledge, previous experiences and senses. In this way, paper explores some of the associated ideas of landscape as a social construction in reflections to people of different cultural, natural and social background.

Keywords
Cultural landscape, landscape interpretation, social construction of landscape, perception, Germany, Russia, Italy

1. INTRODUCTION
The processes of rapid urbanization and industrial development have caused inevitable and often negative changes in cultural landscape in local, regional and global scale (Plieninger and Bieling 2012). It includes loss of diversity and aesthetic quality, transformation of natural environment, change of identity and significance for its inhabitants (individual and social group), etc. (Czepczynski 2012, Musu 2001). In this sense, the role of perception and its effects on spatial behavior and attitudes of different actors to landscape has received an increasing interest in current landscape research (Duncan and Duncan 2009, Palmer 2003). As today’s landscape research targets to support sustainable environments for people living in this landscape, the perception and interpretation of environments by inhabitants would be of a great significance (Micheel 2012, Tempesta and Thiene 2006, Winchester et al. 2003).

Research on landscape perception and interpretation has mainly focused on Europe and the United States, while only few studies on post-soviet countries are available (Bell et al. 2008, Feldt 2010, Karjalainen and Habeck 2004; Matijošaitienė et al. 2014). Although there has been increasing recognition of the significance of cross-cultural studies in recent years, discrepancies and similarities in the landscape perceptions of diverse groups in different global contexts have rarely been investigated (e.g. Priego et al. 2008, Bell 2013, Schoenberg 2008, Matijošaitienė et al. 2014). Such differences in landscape perception can be revealed among people with various social and cultural backgrounds: age, ethnicity, place of
residence (urban or rural, inhabitants or tourists), gender, education, occupation etc. (Drexler 2009). Understanding the different realities that people in diverse contexts construe and their ways of viewing and interpreting landscape is essential, especially in the light of global environmental change requires the cooperation of international communities. Here the research devoted to the case studies are mostly written in native language (e.g. German: Drexler 2009, Grönig 1996; Italian: De Marchi and Ungaro 1999, Tempesta and Thiene 2006, Tonin and Turvani 2011; Russian: Feldt 2010, Kalutskov 2007, Krasovskaya 2009) and inaccessible to English-speaking readers.

The aim of the paper is to explore how different cultural groups (Italy, Germany and Russia) perceive landscapes and their environmental and social changes that have resulted from past and current regional development. It focuses on three case studies (Venice, Arkhangelsk and Leipzig) and attempts to address the following questions:

a) What differences and similarities can be found in the landscape perception between different groups of people from Italian, German and Russian cultures?
b) What changes in landscape do residents consider as suitable and unsuitable for their community?
c) How do people from three different cultures construct the landscape, communicate about the landscape and interpret the changes in the landscape?

The results presented here constitute a part of the international study project conducted from 2013 to 2015 at the Faculty of Geography of Lomonosov State University (Moscow, Russia), the Leibniz Institute of Regional Geography (Leipzig, Germany) and University of Bologna (Italy). The analytical framework was refined within the project “Social construction and perception of landscape exemplified on the regions of Russia and Germany” (2013-2014) supporting by the DAAD and the Leibniz Association, supplemented with the findings from the Italian survey in Venice. The focus was on landscape as social construction and different ways of perceiving and interpreting landscape using semi-structured interviews with regional experts, tourists as well as with inhabitants who have detailed knowledge of the area. In addition to primary data collected in the case study areas during field investigations (summer 2013–2015), the research uses secondary data on the situation of the natural environment obtained from recent regional reports and publications on landscape perception.

2. RESEARCH DESIGN

2.1. Study area

The cities of Venice, Arkhangelsk and Leipzig were chosen as case studies because they are located in regions that have been affected by severe environmental degradation as a result of 20th century industrialization and urbanization processes. Nevertheless, a rich natural habitat and socio-cultural diversity have also persisted. The coexistence of vacant and polluted areas in these regions is (in case of Arkhangelsk and Venice) or was (Leipzig) a particular problem for local governments and communities.

The diversity of cultural landscapes in each case study is determined by historical features. As well-known extraordinary architectural masterpieces, the cities have a long history that goes to 5th (Venice), 11th (Leipzig) and 15th (Arkhangelsk) centuries. All cities played a significant role as major European centers of trade, learning and culture. Today they are economic centers and the livable cities in their countries presented in the list of their 15 top cities by population: 544,479 inhabitants in Leipzig, 259,000 in Venice and 348,783 (2009 Census).

The present-day landscape of the cities is characterized by the signs of former (lignite mining in area of Leipzig) as well as current (petrochemical plant and port in Venice; timber trade, paper, shipbuilding and port in Arkhangelsk) industrial activities. They have induced the negative environmental impacts such as extensive landscape devastation, air and water pollution, groundwater drawdown as well as
threats to health of local inhabitants. In this sense, the management of hazardous waste deposits as well as ground and surface water contamination were and still are the most urgent task of landscape reclamation.

The cities of Arkhangelsk and Leipzig are located in post-socialist areas (Russia and East Germany). However, in Italy communist parties had a strong political presence of for more than a century. The political history of the regions is thus a factor to consider when examining influences on public attitudes towards the environment or landscape. Furthermore, the cities are of crucial importance for actual and future development and economic renaissance of the regions. All three studied regions are close to main transport networks and are provided with a full range of urban services and infrastructure. Also all three cities are recognized as significant for the preservation of cultural heritage. Arkhangelsk and Venice are UNESCO World Heritage Sites: Arkhangelsk as a capital of the Russian North and distinctive place where ancient Russian culture and the most deep-rooted traditions of the spiritual life of the Pomors are conserved; Venice and its Lagoon as an extraordinary architectural masterpiece and a site of technological innovation, i.e. the hydraulic works in the lagoon area. Potential UNESCO World Heritage sites of Leipzig encompass eight places that have played a significant role in European musical history such as St. Thomas Church, Church of St. Nicholas, Mendelssohn House, Schumann House etc.

2.2. Material and methods

The techniques and research methods were derived from a variety of studies on landscape morphology and phenomenology (Duncan 1995; Duncan and Duncan 2009, Mitchell 2002; Sauer 1963, Tilley 1994, Werlen 2000), landscape perception (Groth and Bressi 1997; Kaplan and Kaplin 1989; Meining 1979, Taylor 1998, Tuan 1977) and social construction of landscape (Gailing 2012; Cosgrove 1984; Greider and Garkovich 1994; Kaufmann 2005; Plieninger and Bieling 2012, Wylie 2007). In addition, the approaches and findings of cross-national comparative research on landscape perception were considered (Kaplan and Kaplan 1989, Matijošaitienė et al. 2014, Priego et al. 2008, Schoenberg 2008). It was also based on personal construct theory (Kelly 1955) and theory of place (Canter 1977), stated that perceptions and values of landscape can be differently constructed in a very personal way, depending on the interaction between physical world, activities and individual’s perceptions.

In order to answer the overall objective questions, a new methodology was developed. The first step was to establish the conceptual context, by analyzing published definitions of cultural landscape in Russian, German and Italian geographical research. The second step was to set the practical context by establishing relevant characteristics of the Russian, German and Italian cultural landscapes. Data to make such comparisons were gained from published literature and from field investigations over the past three years using semi-structured interviews with local inhabitants and participant observations.

Semi-structured interviews were carried out in the case study regions in summer 2013-2015. They enabled comparisons between different groups and case study contexts for a better understanding of the meanings constructed by respondents and their diverse interpretations of landscape. A key interest here was to find out how different groups of people (e.g. local experts, inhabitants, tourists) evaluate and interpret landscape and its changes including environmental degradation. Their interpretations are of a particular significance since these groups of people are the direct consumers of landscape resources and have specific relations to the cultural landscape of their everyday life. The questions were designed to gather information about their perception of current situation, its importance and impact on their lives, their own nature-connected relationships and so called “small-homeland” feeling as well as how they perceive landscape changes. In each case study, both male and female adults 18-65 years old with various social backgrounds were interviewed (24 interviews in Venice, 21 in Leipzig, 27 in Arkhangelsk). The duration of interviews conducted in native languages, varied from 30 to 100 minutes and were recorded and transcribed.
3. RESULTS AND DISCUSSION

This research presents first the interpretation of landscape as a social construction. Secondly, a question related to the landscape as a personal construction and in particular, aspects such as perception through senses (smell of place, sound of city, silent space) and influence of memories had to be defined. Thirdly, the overall knowledge about the landscape changes will be highlighted for each cultural group asking them to identify the most significant features of these changes and their consequences for ordinary life of citizens.

3.1. Landscape as a social construction

There are some visual and semantic stereotypes, which were created for many years ago by famous painters, philosophers, poets, writers and are still seen as codes of today's German /Italian/ Russian landscape. Actual reports from mass media have an additional influence. It was stated in interviews that for Arkhangelsk these landscape codes include the long Russian winter, expansive countryside, endless roads, majestic rivers, wooden churches, forests, especially the famous Russian birch. As typical features of Venice, the canals and gondola, the Doge's Palace, masquerade and masks, flood, bridges, inspiration that painters and artists have searched after, romantic, love and spring usually were mentioned. Some similar features were defined also for Leipzig as fire site, a city of music and festival (Bachfest), culture and history, international book expositions as well as German tidiness and orderliness. Close motifs and analogues for sure can be found in other European city, but due to especial and exceptional character, these features have become a national landscape code. All these were a common perception of the landscape from a tourist's point of view.

The influence of information on the perception of a place, which has not yet been visited, is often appeared in the aspects of idealization of foreign landscape: "Venice is voyage to another reality. It absolutely does not matter what did you visited here, the most important thing is to be here" (interview Venice 2013, #4). In this case, people's perception was influenced by what they have read from official or fictional sources about places they visited.

Urban cultural landscape can be seen as an intensive dialogue with both nature and culture not only in their native country but also with travelers. It contributes to shatter diverse stereotypes, such as what is quintessentially Russian, German, Italian landscape itself: "I always thought: Venice is a place promising a happy life. However, with this trip, we started to study an everyday life without rose-colored glasses, but with acute eyes for relevant ordinary details" (interview Venice 2014, #12). Also inhabitants from Leipzig and Venice being in Arkhangelsk stated to be glad to receive a new knowledge about "…desolate ecological situation" (interview Arkhangelsk 2014, #23), or "…use of a real Russian landscape by ordinary people" (interview Venice 2015, #20) in order to create a realist image of actual life in Russia.

Interviewees were also asked to provide main associations (words or phrases) that came to mind when they thought of the landscape. This revealed a variety of perceptions (see Fig. 1). On the one hand, there were views of the landscape of everyday life as a non-build-environment, and some answers have showed an interpretation of landscape as a part of nature / naturalness, recreation (material aspect). On the other hand, there was an association with mental aspects, such as place of identity or memory and nostalgia. This pattern, where the physical (material) elements of landscape according to its intangible (mental) features, presenting duality in the process of landscape interpretation, was relatively typical for each case study.

3.2. Landscape as a personal construct

The visual elements of landscape and their perception as a beauty are closely connected with other sensory features, e.g. sound of birds or sense of stillness and quietness (Schramm 2008). Thus, the
smell of the place may cause a tangible property associated with the landscape. For example, Venice has a mix of different influences perceived through characteristic odor: “If you have ever been in Venice, you definitely have experienced not only its beauty, romantic mood, but also its smell. In some cases, you should hold well a nose before you suffocate or will have a heart attack from the smell of canals and old middle-age streets” (interview with one Russian tourist, Venice 2013, #5). Nevertheless, there was a number of pleasant expressions: “How does Venice smell? … For me it is a smell of cappuccino in the morning” (interview Venice 2014, #14).

As one respondent from Arkhangelsk stated about his trip through Germany, which also included a city of Leipzig: “I knew right away that Germany is a rich country and that the Germans are able to live more comfortably than Russians. For example, the traffic noise was not sensed so strongly as in Russian cities… Masses of people have walked silently… At the bus stops, you did not hear squeaky brakes as in Arkhangelsk. It seems like even dogs did not bark” (interview Arkhangelsk 2015, #25). In interview with one inhabitant from Venice, who was impressed by such features of German landscape exemplified on urban experience in cultural landscape of Leipzig: “In a first-class hotel the baggage has been delivered quietly, the doors were open without creaking, the Elevator ascends smoothly, and even the bathtub was running silently” (interview Leipzig 2014, #16).

Such positive perception of silence can be sometimes mixed with unpleasant experiences or feelings: “This absence of noise and well-regulated traffic in the city definitely impressed me a lot. But I felt that even people seemed to be silent to everything they personally did not touch” (interview Arkhangelsk 2015, #26). “People will mainly ask you about your health out of politeness and only in case you are familiar with them” (interview Leipzig 2014, #19). This emotional neutrality was underlined as a common experience in interviews with both Italian and Russian respondents being in Leipzig. For these cultures, very passionate and very expressive in their speech and ways of life, it seems to be untypical when the city in the late evening or on weekends (especially on Sundays) performs such “absence of moving” (interview Arkhangelsk 2015, #20) or does not “show signs of life” (interview Venice 2014, #19).

Citizens were strongly related to their region and historical and natural heritage of their cities: “What does my city mean to me? Firstly, it is a smell of forest, the sound of the seaside when you walk on the stone quay and usually strong wind into your face. But sometimes it is good, because this wind takes away your problems and strong emotions, and this sea brush up your mind” (interview Arkhangelsk 2015, #26). Similar expressions were found in interviews with inhabitants of Leipzig and Venice: “For me it is
an endless music atmosphere, combining classical, jazz and other music events” (interview Leipzig 2015, #20, interview Venice 2014, #19).

The tourists were attempted to understand foreign landscape by likening it with those they have already explored: “For the first time in my life I am experiencing the sweetness of the opening of new cultures. Sure, the world is not limited to our house, fence and village street, it is really huge” (interview Arkhangelsk 2015, #21). “A life in this city is so ambivalent. Each sightseeing I have read about seems appealing as well as dangerous. Nevertheless, this is what excites me, and there is a growing desire to discover this city with its beautiful places, colors, smells and everything I have not yet seen” (interview Venice 2013, #6).

It can be seen from Table 1 that, for both inhabitants and tourists of all case studies, there are elements of the physical landscape, which are most frequently mentioned as words that come to mind when thinking of the cultural landscape. However, some mental features were also mentioned. In this context, cultural landscape is more a social construct related to images that are associated with some stereotypes being widespread for each culture / nation.

A sense of belonging to the landscape is expressed through the emotional attachment only to a defined place. Respondents from Arkhangelsk stated: “Of course, a visit to Europe have enriched me… In particular, a trip through Venice has impressed me in ways I cannot put in words. However, its beauty is too flashy for me as it can be a living in a grand celebration… When I came back to my home Arkhangelsk, I breathe out as if I wash myself with cool water in a hot July” (interview Venice 2014, #19). It is coupled with identity to specific landscape such as villages, neighborhoods, houses, nature features etc.: “Where can you find trees more beautiful than our birch trees? They are not”. “White nights, full of light, without shadows, it's so immense beauty and you can explore it only here in our North” (interview Arkhangelsk 2015, #26). Also tourist from Leipzig being in Venice stated: “I am so happy to have such nice opportunity to be here and enjoy this beauty, but I feel myself alive just in my homeland” (interview Venice 2013, #6).

3.3. Landscape changes and its perception

Most people considered that the landscape had changed for the worse, although some of them held opposing views. Old respondents were rather pessimistic about the future regional development. Many of them wanted to live in the countryside, but only if their work was in a nearby town.

<table>
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<tr>
<th>Interviewees about Leipzig</th>
<th>Interviewees about Venice</th>
<th>Interviewees about Arkhangelsk</th>
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<tbody>
<tr>
<td>cultivated urban territories</td>
<td>immediate contact with history and heritage site</td>
<td>sea smell</td>
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<tr>
<td>city of music and cultural events</td>
<td>city of music and cultural events</td>
<td>untouched/pure environment/nature</td>
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<td>a lot of green spaces what untypical for urban areas</td>
<td>sea smell and a feeling you are not at the huge continent</td>
<td>desolation</td>
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<tr>
<td>immediate contact with history and heritage site</td>
<td>contrasts between renovated and abandoned areas</td>
<td>contrasts between renovated and abandoned areas</td>
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<td>many places are being renovated</td>
<td>many places are being renovated</td>
<td>bad roads</td>
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<td>deserted buildings</td>
<td>vast territories of sea-port</td>
<td>lack of finance</td>
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The interviewees also have indicated that some of their associations with the today’s landscape and their feelings towards it could have a strong nostalgic element. The pattern here is that it is the current political changes and efforts of somebody who have destroyed the social regime causing such negative social and economic aspects that influence the life of ordinary people in a bad way. This may reflect the fact that possibilities, which urban dwellers had in socialist time, were relatively higher than now and the situation with job availability was better. Many of associations were also related to aspects of landscape changes, which have occurred since the fall of socialist time: abandoned fields, empty buildings, industrial fall-down etc. As expressed one respondent from Arkhangelsk: “We were proud to work in such a dangerous plant… and we were also paid much better” (interview Arkhangelsk 2015, #21). In addition, inhabitants from Leipzig stated that in spite of “The city and surrounding were under a blanket of smoke”, it signaled something positive as “stable functioning of industrial enterprises providing work to citizens” (interview Leipzig 2015, #20) and making visible their contribution to society. This is very characteristic for countries with socialist past, where the benefits of technological production were seen to outweigh the negative environmental consequences in any cases. The results also underlined that older people who can remember the Socialist time tend to think of the Leipzig’s cultural landscape as more resilient and pleasurable, but this is much less true for the young people, especially students. This showed that the younger generation, who only know the post-Socialist landscape, consider it homeland. As generations change and memories fade, such shifts in perception are to be expected.

Nevertheless, the positive changes in landscape were also perceived. In the Russian city Arkhangelsk such expression takes place: “Only now, I have the opportunity to visit the European cities that had previously been a taboo and to examine living situations that were never included in the official images of the mass media, which we can see on TV” (interview Arkhangelsk 2015, #18).

Further differences were found concerning environmental problem solving. Most respondents in Venice perceived tourism as a threat to their way of life and to the survival of their environment. The large cruise ships, which cross the old city, were also seen as "...a new danger" (interview Venice 2014, #12). In contrast, people in Archangelsk mentioned that tourism is "...a great green alternative to polluted industrial development such as pulp and paper industry" (interview Arkhangelsk 2015, #26). Despite the negative assessment of environmental problems in Arkhangelsk, further industrial development was treated as a development priority by the most of interviewees in this area. Generally, they interpreted this as the only way to earn a living. In Leipzig, the majority of respondents supported economic development if it was "environmentally friendly" (interview Leipzig 2015, #20).

In Venice, inhabitants perceived land contamination as a problem that requires attention. They seem worried about the negative effects of these sites, especially the impacts of pollution on the environment and on their health. Thus, they encouraged reuse options that are nonproductive, such as parks, cultural and sport centers or other public facilities. Moreover, abandoned property was perceived as a significant problem affecting housing and neighborhood vitality, commercial district opportunities and social security. The majority of interviewees were informed about the existence of contaminated sites and they were in favor of permanent remediation that reduces risks in the future, even if they are more expensive.

Despite some minor variations, there was agreement between German, mostly Italian and to some extend Russian interviewees that knowing their own communities better and allowing citizens to participate actively would increase the acceptability and the success of brownfield redevelopment projects.

4. CONCLUSIONS

This paper, drawn from a research project investigating the perception of cultural landscape by different cultural groups and a process of social constructing of landscape in different European cities, introduces a research strategy for interpreting cultural landscapes. The case studies of well-known areas of Leipzig,
Venice and Arkhangelsk demonstrate the dynamic relationship between patterns in the landscape narrative and patterns in the actual environment of these urban landscapes. Novelty of the research presented in this paper is highlighted by the fact that for the first time the ordinary landscape perception of the representatives of different European cultures was compared: German, Italian, and Russian. Both the narrative and physical landscape have been shaped by a local process of constant comparison and contrast with well-known touristic routes. In particular, the paper illustrates the variety of landscape perceptions of residents, tourists and stereotypes as reported in semi-structured interviews. The paper analyzes how landscape is constructed in ordinary life of the citizens and shows what it means for the local people to live in such landscape. It also examines the meaning given to the landscape of ordinary life, in the way of individual and social construction of nature.

This research supports the findings of Schoenberg (2008), Matijošaitienė et al. (2014) and Priego et al. that cultural background and individual experiences form a basis of process of perception and combination of cultural background and individual experience form a basis of people’s learning about the world.

When people look at landscape, they do not only see features, but also try to organize and perceive phenomena, to evaluate the most important features or objects, and to put them in a particular order (Kaufmann 2005, Schoenberg 2008). The study results show that the background of each individual is formed by memories, personal experiences, travel, education, etc. supporting ideas of Czepczynski (2012), Musu (2001), Kaplan and Kaplan (1989). Although a basic knowledge according to stereotypes derived from different sources can influence an individual perception, that was also highlighted by Drexler (2009), Greider and Garkovich (1994), Krasovskaya (2009). It can explain, why a certain part of landscape is easy to recognize for people from all three cultures, even for people with different personal experiences.

The cultural landscape is perceived as an important aspect of its country and as a contributor to a sense of identity for the native population as well as landmark of region for tourists (Kalutckov 2007). The focus of many of the words / phrases associated with landscape or selected to describe the features typical of each case study landscape was on naturalness or nature, as opposite to build-environment, but also included mental elements such as place of identity and memory, homeland feeling, which were also found by Bell et al. (2008), Michiel (2012). People’s evaluations are also influenced by previous experiences, expectations and personal objectives (Duncan and Duncan 2009, Gröning 1996) and therefore their background helps to shape perceptions (Groth and Bressi 1997).

The study also contributes to revaluation of cultural landscape and its settings in the sense of their broader interpretation and presentation as a palpable link between past and present (Taylor 2008, Czepczynski 2012). Many interviews stated that it was the memory of past idealistic landscape that forms many intangible elements in a landscape and underlines the importance of some of these landscape elements as being symbolic of the each case study.

In spite of cultural nuances and differences, each case study reveals a landscape as place of identification showing human attachment to landscape and emotional aspects as well as interpretation of landscape through different senses defining smell of place, sound of city, silent space etc. It underlines that there are so many ways, in which people feel attached to and associated with the place of their living or visit, or simply – their surrounding areas (Krasovskaya 2009, Meing 1979, Plieninger and Bieling 2012, Zagato et al. 2016).

The most parts of the case study urban landscapes contain characteristic structural elements and patterns related to physical reality and provide a sense of place and belonging. However, such identification has also a mental nature (Jones and Olwig 2008, Krüger 1987, Turovsky 1998). When respondents were asked what makes a landscape unique, authentic, peculiar, memorable, the answers could not be found just by looking at physical phenomena, such as nature elements and structures. From the inhabitants point of view it is difficult to define which kinds of characteristics make their landscape unique, because the landscape for them always consist in certain combinations of physical elements with intangible meanings, which these elements produce (Kaplan and Kaplan 1998).
According to results, each of the studied cities is considered as a unique brand of its country, landmark of region that needs to proceed their economic, institutional and social development in sustainable manner, in order to exploit the potentials of their cultural landscapes and to face the global challengers (Gailing 2012, Musu 2001). The landscape perception refers to the urban area, which encompasses not only the historical city but also the surrounding local and regional territories (Krasovskaya 2009, Standish 2008, Zagato et al. 2016). Moreover, it underlines that the landscape is not only the site area for different properties and land use, but is also the living organism with its rich historical, cultural and natural mosaic as well as potential (Drexler 2009, Kaluzkov 2007). The study shares the idea of Bell (2013), Palmer (2003), Feldt (2010), suggesting that research on landscape is not only a process involving maps, plans, perceptions, but also a process of rethinking of knowledge regarding attitude of the people towards the place where they live.

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THE LOWER DANUBE LIMES IN BULGARIA. HISTORY OF TRANSFORMATIONS

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ABSTRACT

The Lower Danube Limes in Bulgaria is a system of archaeological sites (military structures and infrastructure) and their context that has the character of a cultural landscape in which many of the relationships between the elements are damaged. Identifying and understanding these relationships is necessary for the preservation and conservation of these sites, which should be subject to a uniform approach to the entire system. One of the preparatory stages for the definition and justification of such an approach consists in tracing the history of the transformation of the system and its known elements from the moment of their creation until today. This will allow the making of a graphic representation of the historical development of the territory, useful for the study of the dynamics of the emergence of relations in the system of the Lower Danube Limes. It will also help for the fulfilment of some gaps in the knowledge about certain sites, or even point to some locations that are not yet discovered.

Keywords
Lower Danube Limes, system, cultural landscape, relationships, transformations

1. INTRODUCTION

The term Lower Danube Limes in Bulgaria refers to the fortified northern frontier of the Roman Empire and Byzantium on the Danube from the 1st to the 7th century (Ivanov 2012: 23). This is a system composed by three main elements: military road, different types of 1st fortifications and sites and a specific environment. The characteristics of the territory determine generally the location, typology and nature of the Romans military structures. On the other hand, the presence of a series of functionally bound man-made elements, subject to an overall strategic plan, gives the territory itself a new aspect (Fig. 1). This combination of natural and anthropological elements belonging to the past forms a relict cultural landscape(1) (Whc.unesco.org 2016).

In the case of the Bulgarian Danube limes, however there are several factors which hinder the understanding and perception of its components as a whole: only the larger sites are known, studied and visited; the binding network of roads and intermediate posts is not present anymore in its whole and fails to fulfil its role as a unifying element; the authentic context is altered. This is a cultural landscape that has lost not only its original function but some of the visual, communicative and material bonds and relations between its constituent parts are also lost or damaged.

One of the current tasks of the preservation of cultural heritage in Bulgaria concerns the Bulgarian section of the Lower Danube Limes. The documentation of the sites belonging to the sector is in process of preparation in order to apply to and eventually join the multinational UNESCO World Heritage Site - "Frontiers of the Roman Empire" (Bglimes.naim.bg 2016) (Fig. 2). At this point emerges the urgent need to consider the formulation of uniform guidelines for the preservation and exhibition of these sites.
In other words it is the right moment for determination of a holistic approach at system level, encompassing both the most significant individual sites and also the other minor elements of the system. The realization of some projects in the recent years show that until now such a need has not been rationalized and recognized, which contributes further to the disintegration of the system.

1.1. Remarks / Methodology

Determining an approach to the conservation of the sites belonging to the Danube limes system requires a profound knowledge concerning the transformations suffered by its elements on the one hand and the relationships between them on the other. For this purpose it is appropriate to create in a GIS a dynamic graphic model of the territory with all relevant elements. The aim of the model is to recreate the changes in time, since the foundation of the system to its collapse and the condition in which it has arrived today. It
will be an instrument helping the identification and understanding of the lost links between the constituent parts of the frontier, and also may eventually point to previously unknown elements.

On its behalf, the construction of the model requires a new interpretation and synthesis of the available historical, archaeological and graphic information about the individual sites and the whole system, as well as the historical processes that shape and transform it. The current study is devoted to this problem. In the course of the study a database of the history of the sites has been built, derived from the bibliographic and archival research, combined with field observations on their current state, location, visibility, relations with the context, etc.

Next step towards the construction of the model is the correct reproduction of the context, as it was during the Roman era and the changes it has undergone since. Therefore, as subject of upcoming studies, it is necessary to examine also the natural and anthropological factors that influence and modify the environment, in which the structures are situated.

2. CONTENTS

Selection of a segment as case study: The Bulgarian section of the Danube has a length of 471 km, and around it there are about 70 known sites belonging to the Lower Danube limes. Due to the large territorial range of the studied system, for the purpose of the practical research a segment which meets certain criteria has been selected. It is chosen to cover a wide range of possible situations of historical, geographical and contemporary perspective. This multiplicity makes possible to draw up a model with a high degree of universal applicability, which can be easily modified when working with a specific site or other sections.

This is the segment Oescus – Novae, with length of 93 km, which includes at least 17 forts (including two legionary camps), part of the Roman Danubian road and other elements of the Roman military infrastructure (Fig. 3). Known fortifications in the segment are(2): Palatiolum, within Baikal village; Ulpia Oescus next to Gigen village; Utus between the town of Gulyantsi and Milkovitsa village; site in Mokreshani locality north from the town of Gulyantsi; Lucernaria Burgon within Somovit village; Asamus, west from Cherkovitsa village; “Osamsko kale” fortress on the right bank of the river Osam; site within the town of Nikopol; Securisca, (“Nikopolsko Kale”), east from the town of Nikopol; “Hisarlaka” above Byala Voda village; “Gorno gradishte”, 6 km west from Belene; “Hisarlaka”, 3 km west from Belene; Dimum within the town of Belene; “Gorno gradishte”, 3 km east from Belene; “Dolno gradishte”, 6 km east from Belene; Teodoropolis within Svishtov; Novae, 4 km east from Svishtov.

Firstly, in order to ensure the applicability of the model, the case study is selected so that the regarded sites are subjected at maximum to the fundamental universal principles that lie within the military policy.

Fig.3. The selected case study segment Oescus – Novae and its sites.
of the Roman Empire and manifest themselves through the military constructions. When laying the foundations of the Limes the differences between the sections are minor. During the actual historical development of the system though, the degree of Romanization of the population manifests itself to a higher degree within the physical environment that it creates and shapes. The analysis of historical and archaeological materials has proven that the segment in which the Romanization has its strongest expression at the Danube limes in Bulgaria is precisely the one between the rivers Iskar and Yantra, i.e. between Oescus and Novae (Геров 1948/1949: 63-66).

Secondly, the criterion for selection of the segment is the fact that there are different situations presented from geographical and topographical point of view, land use and state of the surroundings, visibility on the terrain, level of research, conservation interventions, legal status, etc. [Table 1].

**Chronology:** A number of historical events that are related to the evolution and transformation of the system in the selected area are known from the sources. These are changes of the imperial strategy

<table>
<thead>
<tr>
<th>Site</th>
<th>Visibility</th>
<th>Surroundings</th>
<th>Excavations</th>
<th>Interventions</th>
<th>Law protection</th>
<th>Other</th>
</tr>
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<tr>
<td>Pataviolum</td>
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<td>Built-up area (village)</td>
<td>No</td>
<td>No</td>
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<td>-</td>
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<tr>
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<td>Yes</td>
<td>Partially built-up (village)</td>
<td>Yes</td>
<td>Yes</td>
<td>Archaeol. reserve</td>
<td>-</td>
</tr>
<tr>
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<td>Pasture</td>
<td>No</td>
<td>No</td>
<td>CH, national importance</td>
<td>Treasure hunting</td>
</tr>
<tr>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>-</td>
</tr>
<tr>
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<td>No</td>
<td>Uncultivated area</td>
<td>No</td>
<td>No</td>
<td>CH, national importance</td>
<td>-</td>
</tr>
<tr>
<td>Asamus</td>
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<td>Arable</td>
<td>No</td>
<td>No</td>
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<td>-</td>
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<td>-</td>
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<td>Yes</td>
<td>Yes</td>
<td>CH, national importance</td>
<td>-</td>
</tr>
<tr>
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<td>No</td>
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<td>-</td>
</tr>
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</tr>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>-</td>
</tr>
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<td>No</td>
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<td>No</td>
<td>No</td>
<td>CH, local importance</td>
<td>-</td>
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<tr>
<td>Dimum</td>
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<td>-</td>
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<tr>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>-</td>
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<td>No</td>
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</tr>
<tr>
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<td>Arable</td>
<td>Yes</td>
<td>Yes</td>
<td>Archaeol. reserve</td>
<td>-</td>
</tr>
</tbody>
</table>
and organization, enemy invasion with devastating consequences, construction campaigns of certain emperors, introduction of new building techniques. Military history associated with the area has been studied, analyzed, interpreted and synthesized repeatedly by numerous authors.

The first fortification activities in the Bulgarian section of the Limes start already in the time of Emperor Augustus(7). When creating the defensive line, the Romans preferred certain characteristics of the terrain, but also welded some already developed settlement system. When studying the relationships between the elements of the Roman Limes it is important to understand how the Romans looked at the surroundings and what conditions should have been met by a place to be considered appropriate from a strategic perspective to build a military post.

Naturally, the construction of the defensive system was done in different stages and the criteria for selecting sites for building have varied depending on changing strategic considerations. The first places that should have been strengthened were the most vulnerable points at the confluence of major rivers and right there where the Danube bank is low and accessible from the river. (Рашев 1982: 7-9; Zahariade and Gudea 1997: 24). In the first 2-3 centuries of Roman dominance on this territory, placing the castles at hardly accessible, naturally protected terrain was not a priority. On the contrary, open spaces and slightly elevated terrains near a river have been preferred. The places have been chosen to allow easy communication and to be convenient for the garrison to control the area. These were indeed fortified camps, but their purpose was not to withstand sieges, the battles were led usually at open grounds. A preferred location was at the confluence of two rivers, especially if the main roads followed the river valleys. This allowed the surveillance of the both basins. Strategically important were the river crossings at a bridge or ford and important crossroads. Sometimes it was necessary to sacrifice the good visibility in order to provide direct supervision of the crossings. It was considered an advantage if swampy and rugged terrain protected the site from at least one side. (Johnson 1983: 36-7; Иванов 1999: 147-9). Each stronghold should have been placed at a distance about 22-32 km from the neighbouring forts, that can vary according to the characteristics of the topography (Breeze 2011: 177).

By the time of the establishment of the first strongholds of the Roman domination at the Danube began also the building of a road along the river in order to ensure effective communication between the forts and to facilitate the movement of the imperial troops. Thereafter, the fortifications, built gradually to strengthen the defensive line of the Danube Limes have, so to speak, a roadside character (Бешевлиев 1955: 279, 298).

Archaeologists found that the earliest fortifications founded within the studied segment are Oescus, Tiberius-Claudius time (14-41AD) (Кабакчиева 2000: 109) and Dimum around or before 45 AD. (Кабакчиева, Лазарова 2012: 11). The legionary camp Novae is built around 46 AD (Сарновски 2014: 35). These facts fully comply with the logic followed by the Romans. While this has not been proven by excavations it can be assumed with great certainty that in this period were founded also Utus, Asamus and Securisca that meet all strategic criteria. There are suggestions that at least some of the smaller fortifications around Dimum are contemporary with it or dated from the time of Trajan - Hadrian (Митова-Джонова 1979: 32, 77; Митова-Джонова 2003: 51) (Кабакчиева and Лазарова 2012: 20).

Many authors referring partially to archaeological data and partially to the fact that some Roman settlements have names of Thracian origin, express the opinion that most of the Roman settlements and forts are built upon older Thracian settlements or in immediate vicinity to them, without an interruption in inhabitation. (Иванов 1972: 8-12; Митова-Джонова 1979: 73; Zahariade and Gudea 1997: 56; Иванов 1999: 147). In fact the presence of a period of hiatus is an individual matter. Certainly there is no continuity between the Thracian and Roman fortification construction, since both are subject to different defensive concepts and their locations do not match. (Митова-Джонова 1979: 73; Гочева 1980: 56-65; Рашев 1982: 7).

Archaeological data demonstrate topographic continuity with earlier settlements in Palatiolum, early and late iron age. (11th – 1st c. BC) (Торбатов 2015: 27); Oescus, built near a Thracian settlement from
13th – 11th c. and 10th – 6th c. BC after a period of hiatus (Иванов, Иванов 1998: 54; Кабакчиева 2000: 96), Nikopol, prehistoric and Thracian settlements, 9th – 8th , 6th, 4th – 3rd, 2nd – 1st c. BC up to the mid 1st c. (Аспарухов 1997: 15-17), (Ковачева 2004: 24), Hisarlaka, 3 km westwards from Belene, prehistoric settlement; *Dimum*, Thracian settlement, 2nd - 1st millennium BC; Dolno Gadishte, 6 km eastwards from Belene, prehistoric settlement (Митова-Джонова 2003: 39-40), (Кабакчиева and Лазарова 2012: 7); *Theodoropolis*, signs of inhabitation from prehistoric times up to the middle ages (АКБ 10002596), Novae, Thracian settlement near by, at both banks of Deren dere river, but not within the legionary camp itself (Dyczek, Kolendo and Sarnowski 2008: 24), (Сарновски 2014: 35). For the remaining sites there is no archeological data so it cannot be affirmed with certainty whether there is a continuity with earlier settlements or not.

The presence of an observation and signalization system of towers can be assumed logically, but it has not been proven by archaeological excavations so far. (Zahariade and Gudea 1997: 34).

After the withdrawal from Dacia in 275 AD, the military importance of all the fortifications in the segment grew again. In this period is assumed the placement of small garrisons in *Lucernaria Burgon* (Ковачева 1977: 263) and Nikopol (Ковачева 2008: 14). These are small posts that probably had the function to supervise the surroundings from their higher-placed positions and alert the nearby castles.

After the enemy invasions and the reforms in the second half of the 3rd early 4th c., began an intense fortification activity: from this time dates the building of Osamsko Kale (Ковачева 2008: 16), *Theodoropolis* (TIR K-35 2012: 377), may be Hisarlaka at Byala Voda village, the site in Mokrishan locality, the shifting of *Securisca* at a high plateau. Most of these sites are notably different from the ones of the previous era and this is explained by the change in concepts of military construction. Since the end of the 4th c. dates also the fortification of *Palatiolum*, which previously existed a civilian village of *Oescus* (Торбатов, С. 2015. 25).

The choice of construction sites in late antiquity followed quite different criteria. It is no longer so important to have the fortifications placed at a specified distance from one another, but to choose carefully a terrain that provides natural protection. Heights, with at least three inaccessible sides are preferred, if the place is surrounded by a river it is even better. Construction complies with the features of the area, the number of defenders, the economic resources assigned for the construction of the defense system. The castles have irregular shape, non-symmetrical positioning of the towers, variable wall thickness, all depending on the nature of the terrain. Typical is a strictly individual planning in each case and not obeying the old canons. The distance between the fortresses becomes much smaller - about 5-10 km, their areas are reduced up to 20 daa, the most numerous are less than 5 daa. (Овчаров 1982: 20-23; Пашев 1982: 13-14).

After the collapse of the Lower Danube Limes at the end of the 6th and the beginning of 7th c., the fortifications were destroyed and abandoned. The Slavs who first settled in the territory have no relation to the inherited structures. For them, the main building materials are wood and clay while brick and stone are alien. (Кузев 1979: 28). Their fortification activities consist in strengthening their villages with earthen ramparts. (Овчаров 1982: 88). In material and cultural aspects also can not be traced elements of continuity with the Late Antiquity (Въжарова 1965: 163-4, 188). Slavs do not have an organized state, and therefore the presence of an organized defense system of the territory they occupied can not be expected.

With the arrival of the proto Bulgarians and the formation of the new state Danube Bulgaria, they immediately began to set up the protection of the state borders. The situation with the previous era, however, has changed: while for Byzantium the main threat was coming from the north and the first base line of defense was the Danube limes, for the Bulgarian state the main danger comes from the south, in the face of the empire The Danube becomes actually an inland river as the territories beyond it are also dominated by the Bulgarians (Кузев 1979: 25-6; Овчаров 1979: 96). So the need to maintain a strong fortified line along the river falls out. Except for *Durostorum* (Silistra), no other antique and early Byzantine fortress to the north of the Balkan mountain is used any longer in the early period of the Bulgarian state. (Кузев 1979: 30; Овчаров 1981: 53; Овчаров 1982: 83; Рашев 1982: 175; Алджов 2009: 134). In the
few cases where there is a topographic continuity, there is no functional one (Рашев 1982: 15). Even when medieval constructions overlap the remains of ancient fortifications, they do not comply with their layout and structure (Овчаров 1981: 58; Рашев 1982: 175). In most cases between the two cultural layers there is a period of hiatus of almost a century and a half. Medieval settlements began to be raised above the ancient ruins around 9th – 10th c. (Овчаров 1974: 246; Апакджо 2009: 83-4).

These conclusions are fully confirmed by archaeological data from the section at hand. Topographic continuity is present at: Palatiolum, settlement, 10th – 11th c. (Торбатов 2015: 31); Oescus, settlement (or settlements), 10th – 15th c. (Кузев 1968: 28-9), (Ковачева 2004: 19); site at Mokreshani locality, settlement 14th – 15th c. (Митова-Джонова 1979: 42); Lucemaria Burgon, settlement 12th – 14th c. (Митова-Джонова 1979: 63); Nikopol, early medieval fortification 9th – 10th c. (Аспарухов 1997: 39); Dimum, settlement, 9th – 10th c.; 10th – 14th c. (Кабакчиева и Лазарова 2012: 46); Svishtov, settlement 10th – 12th c. (Кузев 1979: 40; Кузев 1981: 150). No evidence of any continuity at Utus, Asamus, Securisca (Никополско kale), the fortresses east and west of Belene.

Medieval civic buildings were built with weak materials, so they have not damaged much the ancient layers. Different is the case of Nikopol, where probably the fortification activities started already from the period of the First Bulgarian Kingdom.

During the Byzantine reign of 11th – 12th c. the Danube become again a frontier line. Osamsko Kale (Ковачева 2008: 16); Nikopol (Кузев 1981: 127); Hisaralaka, Byala Voda (Митова-Джонова 1979: 36)(8); Svishtov (Кузев 1981: 150) were inhabited again (after monetary findings). It cannot be certainly affirmed whether their role as strongholds was resumed.

Medieval fortification works of the Second Bulgarian kingdom in the segment at hand can be found in Nikopol and Svishtov – locations that unlike the ancient period acquire an important strategic and economic importance. These are fortresses built at places where the river is convenient for crossing and making contact with the Trans-Danubian territories of Bulgaria (Кузев 1979: 28; Кузев 1981: 127,148,154; Митова-Джонова 2003: 54). The construction of the fortifications whose remains are preserved today date from 12th – 14th c. at Nikopol (Аспарухов 1997) and from 13th – 15th c. at Svishtov (Кузев 1981: 150, 154).

These fortresses continue to function during the Ottoman rule. They are repaired and reconstructed many times, but it is considered that they basically preserve their medieval core (Кузев 1981: 125, 138). Svishtov Fortress was blasted by the Russians in 1810 (Кузев 1981: 153), and Nikopol in 1811 (Кузев 1981: 140). In Nikopol the fort was then rebuilt (Кузев 1981: 140), while in Svishtov it was abandoned and subjected to destruction and pillaging (Кузев 1981: 154). Blasting strongholds has been a common practice during the Russo-Turkish wars of the 18th – 19th century. It continued in 1878-79, when according to the Berlin Treaty the rest of the fortresses along the Danube was systematically destroyed by Russian sappers. From the Bulgarian side, the desire to erase the traces of foreign domination finishes the job. Unfortunately, this way were destroyed also the earlier medieval structures (Туleshков 2000: 255). The ruins of Nikopol and Svishtov strongholds are so mangled that it has been impossible to clarify their plans even through archaeological excavations. Idea of their aspect can be acquired by testimonies found in the sources and their presence in engravings and military plans, which are summarized by Al. Кузев (Кузев 1981: 125-140, 149-154), a hypothetical plan of Nikopol fortress by 18th century is proposed by N. Tuleshkov. (Туleshков 2000: 301). From Shkorpil we learn that at the spot of the ancient Asamus over Cherkovitsa village there stood a Turkish fort. (Shkorpil 1905: 461), but we do not know anything more.

The information presented so far would be much more understandable if put together in graphic form. This allows an immediate comparison of the sites and a quick overview of their development (Fig. 4). Naturally, the graphics about the sites that are archaeologically excavated such as Ulpia Oescus, Novae and Dimum are much richer, while the graphics about the other sites are blank at many points. Using the graphics of the researched sites as pillars and the historical framework composed of events that caused damage and building campaigns this graphic is an instrument that will help the further elaboration of
hypotheses about the stages of the development of sites that have never been studied archaeologically. Many of these sites have almost no potential to be ever studied thoroughly by excavations, yet they have to make part in the development of a preservation concept for the whole system. Therefore, the logical deduction based on the scarce known facts is the only way to build an acceptable hypothesis with high level of probability.

3. CONCLUSIONS

The study done so far is an important summary of the evolution of the sites of Roman-Byzantine times in the section Oescus - Novae, which covers their continuity with earlier and later cultural layers. Such a summary has never been made so far. This is the first step towards the possibility of building a graphical model of the territory, which faithfully reflects the chronological development of the system, and does not fix only a selected historical moment. This model will be an important tool for understanding further the spatial relationships and characteristics of the system itself and its context. This knowledge is essential in order to build a common vision for the protection of individual sites and their character, namely inseparable elements of a whole – the Lower Danube Limes.
NOTES
[1] Relict cultural landscape is „one in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.” (UNESCO 2015: 71).

[2] Summary of the commonly adopted identification of the sites with ancient toponyms see in Ivanov 2012: 24-26 and references cited therein. About the identification of Securisca with Hisarlaka above Byala Voda village, in our opinion there are no conclusive evidence. Analysis of the ancient itineraries and the archaeological evidence leads to the conclusion that it is much more likely that Securisca is identical with Nikopolsko kale.


[5] Data from NIICH, December 2015; CH stands for “monument of cultural heritage”.


[7] The question about the conquest and the formation of the province Moesia is not a subject of this paper. For more information on the different hypotheses see: Кабакчиева 2000: 18-21.

[8] The author suggests that this may be an Early Mediaeval Bulgarian fortress, but this is unlikely, given the overall context of the early Middle Ages. Probably the medieval layer dates back to the period of the Byzantine rule.

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AN ECO-BIOGRAPHY OF CALIFORNIA’S SALTON SEA

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ABSTRACT
The Salton Sea is the largest body of water in California. It was created in 1905 as a result of a breach in the Colorado River. This man-made lake underwent a series of curious transformations and today, with its ecosystem on the verge of collapse, it remains a question mark on the American map. My goal is to write an eco-biography of the Salton Sea – that is, to provide a detailed account of its life. In this study, I will identify and examine cultural and ecological transformations of the Salton Sea. I will argue that cultural landscape transformations of the American West have been a combination of profit-seeking rapid interventions followed by long periods of oblivion and denial.

The Salton Sea is not one but many landscapes. In the very beginning it was just a dump, gathering irrigation waters that drained the soil of Imperial Valley. With time, it became a place of leisure for visitors from the neighboring cities of Los Angeles and San Diego. In the 1950s, the Salton Sea became a place of environmental disasters. Today, it is a wasteland and a place, where the mindset of the Gold Rush still echoes through the landscape.

Keywords
Western water history, environmental disasters, Gold Rush, eco-cultural transformation, eco-biography

1. INTRODUCTION

Only a two and a half hours drive from San Diego and an hour from Mexicali, there lies a lake surrounded by a landscape of destruction. Abandoned houses, hotels, marinas will welcome us there, together with the unbearable smell of dead fish. The salinity of water is 30% higher than the ocean’s and the temperature often extends 120 degrees. This area in the middle of the desert is abandoned, but the evidence of human presence is everywhere. As a matter of fact, the lake itself is a human creation, which was never meant to become what it is now.

The Salton Sea is the largest body of water in California. It was created in 1905 as a result of a disastrous breach in the attempt to redirect the Colorado River. The lake underwent a series of curious transformations and today, with its man-made ecosystem on the verge of collapse, the Salton Sea remains a question mark on the American map.

For over a hundred years, humans have been trying to tame forces of nature, but climate, geological conditions and other factors have acted against those attempts. The struggle to transform the Salton Sea and to adapt it to human needs resulted in a series of unfortunate events, which made the lake what it is today: a wasted and forgotten landscape.

In this study, I will identify and examine cultural and ecological transformations of the Salton Sea, in order to provide its biography – that is, to provide a detailed account of its life (Cioc 2006). I will investigate this lake as a living organism surrounded by other non-human and human actors, in order to picture the chain of actions and reactions between human decisions or expectations and nature’s responses to them.
The history of the Salton Sea began 3 millions years ago with the formation of the Salton Sink – the shallow depression which carries its waters today (Laflin 1995: Chapter 1). The area remained dry, with a few episodes of flooding, which created contemporary lakes, most prominently the ancient Lake Cahuilla. Those changes took place without any human intervention. However, in the beginning of the last century, a poorly conducted human endeavor redirected waters of the Colorado River into the deserts of California. Those waters would later form the Salton Sea.

Initially, the decision makers expected the flooding waters to soak into the sands of the Colorado Desert. However, water settled in the Salton basin and remained there. A vast new lake was coming to life in the middle of the desert.

The next major transformation was initiated by the tourist industry in the 1950s. Numerous investors gathered their efforts to reshape the Salton Sea into a holiday resort area. Towns, recreation centers, hotels and marinas were built and in the first few years it seemed that the transformation of the Salton Sea into a leisure oasis was successful (Miracle in the Desert, promotional film for Salton City, California 1962). Meanwhile, a fish die-off began and it became clear that the attempt to profit from the Salton Sea was failing.

Although only very few fish species can survive in the salty waters of the Salton Sea, those that habituated it, managed to develop a huge population. While the recreation areas were being constructed, the agricultural runoff from the fields of Imperial Valley increased the salinity and fish began to die off (Friend 1999). The smell became unbearable as dead fish were floating on the whole surface of the lake. People began to leave the area. Many construction works remained unfinished and turned into ghost towns which surround the Salton Sea nowadays.

The hypersaline waters have been both sustaining the existence of the Salton Sea and destructing its ecosystem for decades. Countless solutions to the hypersalinity have been suggested so far. They included redirecting it, exchanging its waters or dividing the lake into different water reservoirs (“Problems and potential solutions at the Salton Sea” 2014). However, it was not until the 1990s that the lake received an increased attention from policy makers and from the public. Congressman Sonny Bono was one of those activists and policy makers, who triggered a further transformation of the Salton Sea, and the one to draw the national attention to it by initiating the debate about its future and by reviving its wildlife refuge (Devane 2000).

Due to its geographical position and its size, the Salton Sea became a crucial wetland habitat to hundreds of bird species. Proclaimed the “California's crown jewel of avian biodiversity” by the Salton Sea Authority, the area remains a vivid, but still a problem-raising ecosystem. The salinity continues to increase, so does the evaporation, and many disputes are taking place on what to do with the lake. Currently, the dispute takes place between the advocates and the opponents of the restoration of the Salton Sea (Salton Sea Revitalization Program. Proposed Funding and Feasibility Review 2012). However, in spite of the acuteness of its problems, the Salton Sea attracts very little socio-political attention and it continues to sink into oblivion.

The Salton Sea is a place of loneliness, of helplessness and ignorance. It is a place where dreams may come true but are followed by long periods of horrifying nightmares. It is a part of the destructive and inefficient watering system of the American West. It is a place where numbers never add up, as seen through a twisted lens. It is a filthy, bleak and beautiful paradise, a dying and simultaneously reviving itself ecosystem. A failed utopia, an apocalypse, a place where the profit seeking echoes through the landscape and reminds us of the Gold Rush. It is trashed, unwelcoming for humans but welcoming for birds. It is the ugly sister of the pageant queen, Palm Springs. Most importantly, it is a water reservoir without an outlet. It collects the nutrients drained from the soil of the Imperial Valley and dumps them in the Salton Sea, leaving it saltier each year.
2. METHODOLOGY

2.1. Eco-biography and eco-cultural transformation

The concept of eco-biography derives from Marc Cioc’s approach in “The Rhine: An Eco-biography, 1815-2000”. Influenced by his findings, this study will focus both on how and why the ecosystem of the Salton Sea became degraded, as well as on human attempts to restore it. Furthermore, it will define the Salton Sea not only as a water reservoir, but as a complex structure of ecological and cultural components. It will incorporate various elements that constitute and transform the Salton Sea: climatic conditions that surround it, the sink that carries it, waters that fill it together with salt that poisons it, numerous human actors that transform it, as well as fauna and flora of the Salton Sea. I consider humans to be the principal actors, and in order to determine their motivations, I divide them into various groups of interest. Like in the eco-biography of the Rhine, I place the emphasis on tensions between the history of administration, engineering projects and the loss in biodiversity at the Salton Sea (Cioc 2006: 4-18).

The central approach of this eco-biography is the “eco-cultural transformation”. I understand the cultural transformations as results of any form of human actions transforming the Salton Sea. The ecological transformation refers to changes initiated within the ecosystem. The biography of the Salton Sea describes a chain of actions and reactions between the ecological and the cultural transformations.

2.2. The sounds of the salton sea

The creation of the Salton Sea broke the silence of the desert. Depictions of desert are often accompanied by mentioning its deep silence. The main entrance of the Barbara Worth Hotel in El Centro, opened at the Salton Sea in 1927, was inscribed with the following quote:

*The desert waited, silent, hot and fierce in its desolation, holding its treasures under the seal of death against the coming of the strong ones.*

Water from the Colorado River brought numerous new sounds to the desert. With each transformation of the landscape came new sounds. The irrigation brought the swooshing and the tingling sounds of the Colorado River flowing through the canals. Soon, bees were buzzing around the blossoming flowers. There was the mechanic sounds of agriculture machines, of workers using their tools, some of them singing. Soon enough, first ripe fruit would fall down hitting the ground. The sound of growth and abundance emerged from the desert silence. After the flood stopped and the surface calmed down, a myriad of new sounds was emerging both under the surface of the Salton Sea and above it. Fish and barnacles were bubbling and splashing under the water. On the surface and on the shore, birds began to nest, spreading the sound of their wings flapping and of their songs. Soon enough, with the tourist industry booming, sound of wind in the sails could be heard. The sound would change with each of the consecutive disasters.

In my study, I will analyze the available sources with a strong focus on the sounds they describe. It is my goal to give a voice to the protagonist of this eco-biography, thus I will listen to it.

2.3. Gold rush and its trash

The ethos of the American Dream powered the transformation of Californian landscape in the middle of the 19th century, when thousands of gold-seekers dug through hundreds of miles of California soil. Invasive gold extraction methods such as hydraulic mining resulted in soil erosion and deforestation and in releasing millions of pounds of mercury into the environment (Alpers 2000).

I observe several parallels between the California Gold Rush and the history of the Salton Sea. In both cases, driven by a bonanza-mindset, humans extracted their profit directly from the landscape, which resulted in severe ecological and cultural consequences. In order to identify and examine the relations between human endeavors and natural responses, I will see the Salton Sea as a “gold mine”. While in
the case of the Gold Rush, the consequences were long-term and dispersed through thousands of miles, transformations of the Salton Sea were spatially isolated and became visible more rapidly.

After the exhaustion of the bonanza, the Salton Sea became an abandoned mine. Water, initially the treasure of the Salton Sea, became trash due to salinity and evaporation. Towns and marinas, once built to celebrate the beauty of nature, turned into rusted ruins surrounded by a rancid smell, now giving home to illegal methamphetamine laboratories and to the poorest communities in California. The Salton Sea’s beaches are made entirely of pulverized fish bones, which could easily be mistaken for sand. While this “post-apocalyptic” landscape does not attract many visitors, it remains an oasis for countless bird species.

I consider the Salton Sea to be a trashed and wasted landscape. This trash is a by-product of the bonanza periods, when humans attempted to draw profit from the Salton Sea. Trash - a highly anthropocentric term - is what cannot be sold anymore, it is an intermediate stage between a past of being used and an uncertain future of either being re-used or forgotten. In his essay “On Waste Lonely Places”, John Landretti observes that human attention is mostly drawn to aesthetically pleasing “bastions of grandeur” such as national parks. He argues that wastelands, unappealing, abandoned and “lonely” places deserve our attention as well (Landretti 2007: 154-155). Relying on this notion, I urge that there is a necessity to treat wastelands as sources of valuable findings.

Limerick claims that the Gold Rush greatly influenced the Western society and shaped its way of thinking. “Mining set a mood that has never disappeared from the West: the attitude of extractive industry – get in, get rich, get out.” This attitude was typical to the engineers, who wanted to control the Colorado River, but who were at the same time in denial of potential consequences. The emergence of the Salton Sea fits rather accurately in Limerick’s notion of “shaking” introduced in “The Legacy of Conquest”. Limerick states that the Gold Rush gave the American West a good shaking and that vibrations from this shaking are still noticeable in the West. She applies ten characteristics of mining to cultural practices that occurred in the West later in time. I believe that those characteristics can be applied to the Salton Sea, to its creation and beyond (Limerick 2007: 214-227, Limerick 1987: 100).

Firstly, the Gold Rush resulted in a heavy friction with Indian tribes, who were relocated and whose status would worsen. This happened at the Salton Sea with the mobilization of thousands of Indians for the rescue operation during the flood of 1905. Secondly, due to the white American “talent for claiming legitimacy”, the newcomers did not hesitate to claim that both the territory and the resources belonged to them. Thirdly, the Gold Rush accelerated urbanization, which can be observed in the Imperial Valley with the rapid growth of population in the beginning of the 20th century. Fourth, the Gold Rush was a bearer of bad sanitation and of bad smell. Soon after it was created, the Salton Sea became the sewage of the Imperial Valley and its smell became its defining characteristic (Limerick 2007: 214-227).

Limerick’s fifth and sixth aspects of the Gold Rush constitute the people’s dependence on others in obtaining food and the need for agriculture related to it. Agriculture emerging in the Imperial Valley heavily relied on the irrigation system, i.e. on the Colorado River and on the makers of the Salton Sea. The seventh aspect is the close relation between mining and the water issues. With the emergence of the Salton Sea, a new system of water distribution was created, leading to conflicts about water rights and the emergence of groups introduced by Worster in “Rivers of Empire” as the water elites. Further, the Gold Rush created unusual gender demography. Females became very significant due to their small proportion in the society. The ninth component of the “shaking process” was the nostalgia, terrible experiences, and the loneliness of the resettlement. The last aspect is the abandonment of the area and environmental threats resulting from it. While there was no leakage of acid and heavy metals at the Salton Sea, it was the salt content that became its poison (Limerick 2007: 214-227).
3. SIGNIFICANCE OF RESEARCH & PRIMARY CONCLUSIONS

3.1. My own paths across the levee

The significance of this research strongly relies on assumptions of two leading figures in environmental history: Donald Worster and John Robert McNeill.

McNeill observes that the discipline of environmental history maintains “a terrestrial bias”. While issues connected to the land continue to attract a large attention in this field, aquatic ecosystems remain an unexplored area. Rivers constitute the core of the aquatic research, while other bodies of water are given less attention. According to McNeill, putting together a picture of the transformations of some bodies of water, especially in the course of the 20th century, is feasible and is still missing in the field (McNeill 2003: 42).

Ten years after the publication of McNeill’s article, lakes remain on the periphery of environmental history. I will argue that this tendency is caused by the nature of lakes. A lake, defined as a considerable inland body of standing water, is more static and isolated when compared to the dynamic rivers, seas and oceans. Closely related to ponds and creeks, lakes may sometimes seem to merely serve as water reservoirs that support dams. Rarely used for transportation or as energy sources, they do not attract much academic attention. Even in situations of far-reaching environmental crises, there is a lack of interest from science (1).

Nevertheless, lakes should not be underestimated. Firstly, they provide habitat for countless species and secondly, they are a great source of recreational use for the humans. As a rather isolated body of water fed only by agriculture runoff, the Salton Sea remains vulnerable to the influences from the outside. A strong belief in McNeill’s assumption about the demand for more aquatic analyses will assist me in the research process for this study.

In “Paths Across the Levee” Donald Worster recollects the story of the forgotten Cow Creek in Kansas (Worster 1994: 16-29). The creek has been degraded since the arrival of the first European settlers and nowadays it vanished both from the landscape and from the local memory. The levee construction around the human settlement was an engineering solution to prevent the creek from flooding, but it also caused the once so marvelous landscape to fall into oblivion. Worster makes three crucial points in this essay: firstly, that such stories of environmental transformation can be found everywhere around the globe. Secondly, that nature transformed used to be wonderful, mysterious, and threatening. Thirdly, that only when we realize how much our history was dependent on the interaction with nature and its forces, will our history be truly complete (Worster 1994: 18-19). I believe that even two decades after the publication of Worster’s essay, approaching those seemingly small stories of landscape transformations can help us draw conclusions not only about the local aspects but also about the complexity of relations between humans and nature.

The levee in the Cow Creek story is a symbol for the limited view humans have on the landscape. Worster points out that historians should create paths across those levees, in order to investigate forgotten landscapes. The Salton Sea is also surrounded by an invisible levee of oblivion and this study aims to dig a path across it.

4. FACING THE NEXT TRANSFORMATION

The 2003 Quantification Settlement Agreement secured California water supplies for the next four decades and “provided a restoration path for the environmentally sensitive Salton Sea”. However, both salinity and draining remain severe problems at Salton Sea and the draughts continue to destroy crops in surrounding it Imperial Valley (Friend 2000), (2).

As previously mentioned, the Salton Sea provides shelter to numerous bird species. The Sonny Bono Salton Sea National Wildlife Refuge located at the lake is one of the most diverse national wild refuges
in the West. The presence of birds brings a sense of hope to this contaminated area, but recent disease outbreaks resulting from toxic poisoning are reoccurring in the area. Many of those outbreaks have been catastrophic to the bird population and the Salton Sea has been designated as “an ecosystem under severe stress” (Friend 2000).

The second major threat is the toxic dust. If the evaporation of the lake continues, chemicals combined with sand will endanger local ecosystems, human settlements and local agriculture. Contaminants including arsenic will spread with the wind, which could be life-threatening to people and wildlife. This makes the Salton Sea the “ticking bomb” of the American West. Due to similar developments, Lake Urmia in northwestern Iran is about to dry up by the end of 2014. This will result in an exposure of toxic salts, which will be releases into the nearby farmland (3).

In spite of the urgency of those issues, no solution to the desalination has been found and no long-term plans have been enforced, due to very limited funds at Salton Sea. While the budget of the Salton Sea Authority has been insignificantly increased over the past years, merely $200,000 has been budgeted by the Army Corps of Engineers for evaporation prevention at the Salton Sea in 2015 (4). In this environmental biography of a region so deeply touched by both human interventions and their ignorance, I will examine the reasons for both the interventions and the negligence.

5. CONCLUSION

In this eco-biography of the Salton Sea, I will bring into focus unintended consequences of cultural transformation of landscape. Those processes will be pictured as paradigmatic to larger tendencies taking place globally.

There are several conclusions to be drawn from the history of the Salton Sea. Firstly, it demonstrates that ecosystems seemingly “conquered” by humans are still free to develop into unexpected directions and that nature continues to surprise us by working its way towards self-restoration. Thus, the Salton Sea is a proof that ecosystems are not passive recipients of human actions, but that they react to changes and are able to recreate themselves. Secondly, it shows the rise and fall of the American Dream, in particular the inevitable collapse of desert projects connected to water scarcity. Thirdly, it shows that those changes take place very rapidly, turning a “lucky” and “privileged” place into a cursed and forgotten landscape. Finally, this study argues that environmental responsibility is often forgotten due to strong motivations for profit, and that those profits bring large-scale losses after short periods of success, prosperity and a sense of achievement.

CHAPTER SUMMARY

Chapter 1 – Introduction - This chapter will provide basic information about the Salton Sea, together with definitions of the key terms. It will introduce the methods and the central research question. The relevant literature and academic debates will be reviewed and an outline of the content of each chapter will be presented.

Chapter 2 – Pre-1905 history of the Salton Sink – Beginning with introducing the ecological, geological and climate conditions of the Salton basin and introducing the Colorado River, this chapter will follow the early developments until the flood of 1905.

Chapter 3 – Clogged expectations – This chapter will discuss the circumstances surrounding the construction of the canals redirecting the Colorado River and the accident of 1905 leading to the formation of the Salton Sea.

Chapter 4 – The oasis emerges – Beginning with the aftermath of the flood, this chapter will follow the
transformation of the Salton Sea until the early 1960s. The emergence of an entirely new ecosystem, together with the agricultural development in the Imperial Valley will remain in focus of this chapter.

**Chapter 5 – Selling the dream: The holiday resort era and its sudden end** – The large-scale holiday resort projects will constitute the main focus of this chapter. It will present the process of turning the accidental sea into a desert oasis and it will sketch the expectations and experiences of investors and visitors. This chapter will picture the sudden transformation from a leisure center to a deserted ghost town.

**Chapter 6 – One man's trash is another bird's treasure** – This chapter will describe the timeframe between the early 1970s and the late 1990s. In the first part, it will focus on the decline of human interest on the one hand, and on the increasing habitation of the Salton Sea by hundreds of bird species on the other. In the second part, this chapter will picture the revival of the wildlife refuge and the increasing public attention in the 1990s. Activists, decision makers and their initiatives will be introduced and further changes in the ecosystem will be pictured.

**Chapter 7 – Gold Trash. Wasted paradise and its inhabitants** – This chapter will discuss the transformations that took place in the last 15 years. It will present the latest disputes, solutions and conflicts surrounding the Salton Sea and will picture the dangerous tendencies in the increasing salinity and evaporation of the lake. The influence of those tendencies on the biodiversity of the lake will be discussed. A field-trip to the Salton Sea will provide the most current sources on the topic.

**NOTES**


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METAL – BOARDER – RITUAL. HOARDS IN LATE BRONZE AGE AND EARLY IRON AGE LANDSCAPE

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ABSTRACT
Hoards make one of the most mysterious categories of archaeological finds known from the Bronze Age and the Early Iron Age. Doubts concerning their function should encourage researchers to use as wide information range as possible for understanding this phenomenon. However, there are still few scientific works considering their relationships with the settlement network or the cultural landscape. The presented text focuses on grasping regularities in location of spots of collecting articles made of bronze and iron, based on the results of studies over metal deposits from the Late (Urnfield culture) Bronze Age and the Early Iron Age from the South Baltic Coastland and Lake Districts.

Keywords
Landscape, Bronze Age, Early Iron Age, Hoards, Settlement

1. NEW (THOUGH KNOWN FOR A LONG TIME) SOURCES FOR THE STUDY OF LANDSCAPE IN THE LATE BRONZE AGE AND THE EARLY IRON AGE

Metal used by the prehistoric communities constituted a mean of communication, gained numerous meanings and was the accelerator of many changes in culture (Pare 2000). In the Bronze Age and the Early Iron Age, the most spectacular and at the same time, most difficult to interpret, cultural phenomenon connected with metal objects was their mass depositing in earth and water. In the archaeological terminology such finds are referred to as hoards.

Connecting the mentioned behaviour with the biography of artefacts – a number of meanings given to them earlier – may be helpful in understanding this phenomenon. Therefore, a better understanding of the phenomenon of depositing metal objects will allow for a wider interpretation of the mentioned, earlier stages of functioning of metal articles in the past culture and – largely – the culture itself. To understand this phenomenon properly, a wide context of culture, meanings and functions should be taken into account (Stevens 2008: 246-247, fig. 2). The history of studies over the phenomenon of depositing groups of metals in earth or water shows that to date researchers have concentrated on the chronology of such finds. Categories connected with space, particularly from the local perspective, were marginalized (Maciejewski 2016: 19-22).

The previous interpretations have referred to the constant set of premises, which often were arguments in support of contradictory hypotheses (Fontijn 2002: 13-21, table 2.1-2.3). Moreover, they often took into account the current understanding of economy, the concepts of ownership and production processes (Harding 2000: 354; Bradley 1998: 17-21). Extending the pool of premises used for interpretation of the phenomenon under discussion with those resulting from the settlement analyses, reflection on the landscape and the biography of things, which is called for in this text, gives a possibility of a better understanding of the phenomenon of mass depositing metal objects in water and earth.
Reflection on the cultural significance of space has been growing intensively for years. One can also observe an increase in data. Similarly, a set of tools helping in reconstruction of ancient settlement structures is increasing. In this situation, an answer to the described research impasse is a new trend of research over metal finds. The phenomenon of depositing hoards of bronze and iron artefacts in recent years is increasingly being interpreted including data on their place in the cultural and natural landscape, and in relation to the settlement network (Fontijn 2002; Hansen, Neumann and Vacht 2012; Maraszek 1998: 67-74; 2006: 265-288; Rundkvist 2015; Salaš 2005: 195-214). Similar studies were undertaken of the finds from the area of South Baltic Coastland and Lake Districts (in accordance with Physico-Geographical Regionalization of Poland according to Kondracki 2009), which were deposited by communities respecting the cultural norms of the urnfield culture circle. The described research project is distinguished by the ability to use data collected within the framework of the project Polish Archaeological Record. Thanks to their consideration, a detailed, systematic research of relations between the local settlement network and the places of depositing hoards was carried out, which allowed drawing conclusions on the intentionality of choice of places where this was done and on their significance in the landscape.

2. PLACES OF DEPOSITING METAL OBJECTS AS ELEMENTS OF THE LOCAL SETTLEMENT NETWORKS

Hoardsh composted of metal objects are a specific category of archaeological finds. They have often been discovered by chance, most of them date back to the turn of the 19th and 20th centuries (Maciejewski 2016: 22-24; Blajer 2001: 311-374). Nowadays they often fall prey to amateurs using metal detectors for illegal search, who only sometimes share information concerning their finds with archaeologists. Many times this information is very vague (cf. Fudziński and Fudziński 2010; Żychlińska 2009). In both cases the knowledge about the exact location and context of discovering the hoards is little. This information is necessary to carry out reliable research on relations between the places of depositing hoards and the settlement network. Due to the awareness of this stage of the source base, the initial stage of the work in question was a preliminary survey of publications and archival data combined with the use of different types of maps – archival, modern and aerial photographs and satellite pictures. Thanks to this it was possible to determine the exact or approximate locations of 83 out of 432 hoards qualified for the study, which makes 19.2% of the whole collection (Maciejewski 2016). Those findings indicate the existence of a pool of data possible to examine using methods known from geography of settlement, spatial archaeology and landscape archaeology.

All the hoards with known location were subjected to analysis comparing their composition with the topography of their findspots. Did the analysed communities prefer any similar places – in respect of the specificity of the landform and natural features – for depositing particular categories of metal objects there? That was the question opening these analyses. A few typical locations were outlined: (1) within flows or water bodies, bogs, peat bogs; (2) on hillsides of valleys; (3) on uplands, together with some more detailed categories (4) on islands and peninsulas, also with distinguished several more detailed locations. Another step of the analysis was to determine the number of metal hoards categorized into particular “topographic types”. Next the inventories of individual hoards were analysed in the context of location within the mentioned types. Based on the conducted analysis it was proved that the mentioned preferences did not occur (Maciejewski 2016: 79-90).

The other of the used analyses considered a much greater number of data and variables. This was a study of the settlement background of the particular hoards. The amount of information and the scope of research provided a considerable higher research potential, but they also required concentration on a part of the finds only.
It was recognized that finds deposited in the dryland have the highest research potential for deliberations over the cultural aspects of location of hoards from the perspective of the local settlement network, since the choice of place of their depositing was not affected by the water network, occupying each time a marginal part of the studied areas (in contrast to hoards deposited in the wetland). Also hoards deposited within the limits of simultaneous settlements and cemeteries were ruled out. This resulted from insufficient knowledge of the internal structures of such places. The choice of hoards subjected to the research in question required also consideration of the progress of surface research conducted within the framework of the Polish Archaeological Record (Ziółkowski 2005) and the degree of accessibility of the area for such prospections. Figure 1 and Table 1 present twelve hoards selected based on those criteria, which were studied within the limits of eight areas (Maciejewski 2016: 91-93).

The research was conducted using methods referring to the tradition of settlement geography, taking into consideration both the results of the surface research, creating a picture of settlement hardly diversified chronologically, as well as diachronic variability perceptible thanks to the analysis of chronology of cemeteries. Various natural data was also included: the current landform features, hydrography, the soil cover, data on geomorphology, a map of potential vegetation. In cases where such a possibility occurred, reference was also made to published results of palynological studies. The collected data was also subjected to analysis with the use of methods of spatial archaeology: the Clark-Evans test and the Steinhaus habitation index. In each case, also the specific character of the analysed hoards were taken into account – their composition, the context of discovery, the specific character of each spot identified among others during local visions (Maciejewski 2013a: 93-153).

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Fig. 1. Deposits of metal objects chosen for detailed analyses of the settlement background together with regions where the study was carried out (1 – deposits of metal objects; 2 – the boundary of the studied region; 3 – boundaries of regions chosen for detailed study of the settlement background).
Conclusions on the relationship of the selected hoards with the local settlement are presented in Table 2. They can be summed up by stating that metal hoards were deposited on the border between a settlement agglomeration and uninhabited land or on the border between settlement agglomerations. Such relationships were registered eight times. In two cases metal objects were deposited within the limits of a settlement agglomeration. For Kczew, depositing within the limits of another element of the settlement network or in its vicinity does not raise doubt, whereas for Nowogard, it will be more appropriate only to suggest such a possibility. The third category includes deposits for which both interpretations are equally probable, and the current state of knowledge, as well as the specificity of the zone the hoards come from, do not allow us to confirm one of them. It seems to be important to pay attention that the places from which those metal hoards are known, from the perspective of knowledge on the settlement preferences of the studied communities, constitutes convenient spots to establish a settlement or cemetery.

3. ON THE BORDER – INTERPRETATION

The conducted research was supposed to answer two questions. Firstly: is it possible to grasp repeatability in relationships between the places of depositing hoards and the local settlement network? Secondly: how can the mentioned relationships or the lack of them be interpreted and in what way this increases our knowledge on the community of the Late Bronze Age and the Early Iron Age?

The answer to the first question has already come. As a reminder, it should be stated that the hoards of metal objects were deposited in the particular relations to intentionally created components of physical space – the settlement network (Fig. 2).

The other question is more significant, and the answer requires taking into consideration a broad spectrum of knowledge about the human culture, its specific character in the analysed period, the perception of metal, the importance of contacts between the community members and different groups...
of people, a value given to objects as well as space symbolism and its particular elements. Combining the mentioned theoretical, all-humanistic and prehistoriographic knowledge with the quoted results of researches allows us to propose a model explaining the social meaning of acts of mass depositing of

<table>
<thead>
<tr>
<th>Hoard</th>
<th>Relations with the settlement network</th>
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| Bobrowiczki/Slawno   | Two alternative interpretations:  
1) the metal deposit was placed on the boundary of two settlement agglomerations, the first one on the River Wieprza at the mouth of the River Moszczenczka running further south and the other, on the River Grabowa or alternatively – in the vicinity of the villages of Karwice and Rzyszczewo;  
2) the deposit placed within a settlement agglomeration, unregistered during surface research due to historical and modern damage and unavailability in the Slawno housing area; a place of depositing the hoard could be connected with the contemporary element of the settlement network (a cemetery – a later grave "from the same field"). |
| Główczyce            | A hoard was deposited between two settlement concentrations. The first one was situated on the latitudinal fragment of the Główczycki Stream, and it functioned from HaB2-3. The other concentrated on the River Skórzynka and the lower fragments of the River Pustynka, River Klęciński and the Główczycki Stream in the Early Iron Age, perhaps also earlier. |
| Granówko             | A hoard was deposited on the boundary of a settlement agglomeration including settlement relicts located along the Rivers Mala Ina and Koczynka and numerous ribbon lakes. |
| Kaliszanki           | Metal goods were deposited on the boundary of the settlement connected with the lake complex (with the largest – Lake Kaliszanka). At a certain distance there is a settlement agglomeration, connected with the River Welna and a glacial channel running from the vicinity of Wagrowiec to the area of Golańcz. |
| Kczewo               | A hoard placed within the frame of a contemporary element of the settlement network (a settlement or cemetery) or in its immediate base. |
| Nowogard             | Two alternative interpretations:  
1) a hoard was deposited within the boundaries of a settlement agglomeration whose trace were destroyed by later, historical settlement, particularly the modern building of Nowogard, artefacts could be connected with a contemporary element of the settlement network, most probably a settlement;  
2) the collective find was deposit in the inhabited area, but being a place of depositing metal goods (perhaps in a lake). |
| Rosko                | A hoard of metals was deposited on the boundary of a settlement concentration around the River Noteć valley, where settlement was very intensive. |
| Rudka                | Deposit was placed either on the boundary of the settlement agglomeration in the area of Lakes Luboszek, Lubosz Wielki and Pniowy and the upper fragment of the River Mogilnica Górna and perhaps Lake Białokosie, or between this agglomeration and the second one, situated on the upper Osiecznica. |
| Stefanowo            | A collective find of metals located on the boundary of the settlement concentration connected with the River Noteć valley, characterized by a very intensive settlement. |
| Stołężyn             | A hoard of metal objects located on the boundary between the settlement concentration on Lake Czeszewskie and settlement relics around the River Kcynka tributary, located further north. |
| Uścikowiec           | Bronzed were deposited on the boundary of two zones of intensive settlement: the first one on the River Welna until its mouth, and on the southern side of the River Warta, and the other – along the River Samica Kierska. |
| Żelazo               | Two alternative interpretations:  
1) artefacts was collected on the border of the settlement concentration on the lower River Lupawa, on the slope of a morainic elevation, near the elevation Rowokól, which was characterized by a considerable elevation in relation to the surrounding area.  
2) metal objects were deposited within a settlement concentration not confirmed in the sources in this zone due to unavailability of this place for surface studies; this place could be connected with the contemporary settlement form (a settlement or a cemetery.) |
metal objects. This model explains potential reasons for depositing metals in earth, the choice of place for such an act and its function. It combines (in a syncretic way) explanations referring to different spheres of culture of the studied human groups (technical and functional, symbolic and communicative and that of outlook). Moreover, the outlined process is dynamic from a chronological perspective.

The essential fact for understanding the symbolism of acts of depositing metals on the borderlines of inhabited areas is similarity in perception of metal and a border. Metal – both the raw material, articles manufactured from it and the process of their production – fascinated, and at the same time, they aroused fear. It was still something new, extraordinary and exotic, it was of prestigious significance, it opened an opportunity to make objects which were inaccessible earlier – gave the freedom of creation unattainable before. Metallurgical processes joined together the elements: of water, air, earth and fire. The latter was particularly essential at the time of cremation funeral rite. Additionally, metal had aesthetic values which had been unknown earlier (Bradley 1998: 82-83; Stevens 2008: 241-242, 246-247, fig. 1; Fontijn 2002: 254-255; Giles 2007: 400-406; Kadrow 2001: 104; Kowalski 2006: 21; Kristiansen, Larsson 2005: 39-41; Mierziński 2012; Neustupný 1998: 25; Nowica 1998: 395; Pare 2000; Popko 1980: 49, 52, 119-124; Rowlands 1970: 216; Suchowska 2010: 42; Żak 1983: 201). The symbolism of borderlines separating two categories corresponding to the duality of human nature was similar. From the one hand, they satisfied

Fig.2. Model presenting deposits of metal objects as elements of the settlement network based on the space description used in the method of mental maps (legend: 1 – cemeteries – junctions; 2 – permanent and seasonal settlements – junctions; 3 – hoards – junctions, landmarks; 4 – paths; 5 – fields, pastures, fishing grounds (hunting grounds?) – regions; 6 – edges).
the need for safety and stability, from the other, they were equated with the desire to have an adventure arousing both fear and curiosity, being a threat, but also a chance to gain prestige, knowledge, contact with the supernatural powers and ancestors, gaining exotic objects or materials, and in consequence, even power (Anschuetz, Wilshusen and Scheick 2001: 167; Buchowski 1987; Bystron 1939: 28-32; Czarnowski 1966: 222-223, 227; Kowalski 1999: 16-20; Danka and Kowalski 2000: 240; Douglas 2007: 149, 171; Eliaide 1974: 53; Golka 1999: 14-18; Jałowiecki and Szczepański 2006: 326-327; Kantner 2008: 42; Kristiansen 1998: 1; Leach 1989: 46-48, 68-69; van der Leeuw 1978: 88, 179, 444; Lejman 1999: 92; Rowlands 1993: 142; Tilley 1994: 17; Tuan 1987: 194; Wojciechowski 1998: 146; Woźny 2000: 123, 143). Therefore, the choice of marginal zones – in respect of inhabited micro-regions – for depositing metal objects was connected with similarity of symbolism given to both metal and borders.

The described location of hoards was also connected with their practical function. Such places organized the physical world and helped to move in it. They were both markers of borders, passages through the borders, and characteristic landmarks on local, and perhaps interregional, routes. Some of the studied deposits were put in places e for various reasons facilitated moving (cf. Kośko and Kločko 2011). This is indicated by: location near water flows of importance in the local contacts (the case of Rosko – Maciejewski 2006: 212-213, fig. 6), convenient location within the passage over wetlands (the example of Kaliszanki) or a connection with places where the functioning of crossing was historically confirmed (the example of Bobrowiczki/Sławno). If there are no such observations for other analysed finds, it is still possible that they were once connected with similar routes. Unfortunately, archaeological sources which can directly indicate the existence of such local connections are very rarely discovered (Rączkowski 2011).

In three cases one may also talk about monumental stone structures erected in places of depositing metal objects. In Rosko, relics of such establishment were identified during an excavation (Machajewski and Maciejewski 2006). In Kaliszanki, the embankment is still visible in the local landscape (Maciejewski in print), in Stołężyn, in turn, archive records indicate the existence of such a structure. Similar mentions refer also to some other finds from Pomerania and Great Poland. On the one hand, the existence of such establishments confirm the quoted interpretation about places of depositing metal objects as essential points in the landscape, on the other, it draws attention to the character of the act of metal deposition. If it was connected with erecting the mentioned structures, this was an activity previously prepared and carried out by a larger group. Therefore deposition of metal object was not aimed at hiding them in fear of their material value or for safekeeping, as is often suggested in interpretations of such finds.

The mere act of depositing in earth artefacts having above-average value undoubtedly constituted a clear message. Combining the said practice with erecting a monumental structure strengthened the significance of such behaviour, as well as greatly lengthened the impact of the content. The message under discussion was addressed to the group members, but localization of those activities in the marginal zone of settlements indicates that “strangers” were equally the recipients of the message. On the one hand, metals deposited in such a place might have been gifts for the supernatural powers (Hänsel 1997) or ancestors (cf. Giles 2007: 400-406), on the other, these activities were directed to the neighbours, they constituted the act of marking a borderline, they also were manifestation of the potential and generosity of the group. It is notable that linguistic sources (Kowalski 1999) show a similarity of perception of the supernatural powers, the dead and representatives of other groups. The act of depositing performed its functions both if it was done in the presence of representatives of other, neighbouring groups, as well as without their participation, since in the social practice not all communications are formed directly to the recipient. If in the place where metal objects had been deposited a structure was erected, a stone was placed, or other visible traces of a rite were left (currently intangible with archaeological methods), such a place automatically becomes a non-verbal message, confirming this event and informing about its importance. It was not a problem for members of other groups cultivating similar traditions to read such a message. Additionally, that place both marked the limit of the safe, appropriated, world and informed the “strangers” about entering the domain belonging to the particular community.
Hoard of metal objects also perform a number of functions, which should be described as organizing the social world. They regulated relations in the group, establishing and consolidating social relations. They prevented considerable social diversification – by excluding objects gaining too high value, and consequently, giving a higher prestige, from the cultural circulation. Thereby they helped to avoid internal conflicts which were of growing importance together with an increase in numbers of the communities under discussion at the end of the Bronze Age and in the Early Iron Age. Rituals of depositing metal articles in earth at all their stages integrated the group. The places where this was done formed part of cosmological patterns, and consequently, in the cultural norms, which allowed the community members to make themselves acquainted with them and to consolidate them into practice. Each cosmological pattern is visible on all levels of the world organization. The situation is similar when it comes to metal deposits that constitute a symbolic gate to a certain inhabited zone. This arrangement replicates the patterns visible on other levels of the organization (Fig. 3). The act of depositing metal articles on the border of the inhabited territory constituted also a means of communication between groups, it gave the opportunity to manifest wealth, to build prestige, to emphasize sovereignty and to balance positions in dialogue between communities – partners with different potentials. In this case, it created chances to control the conflicts.

Some processes occurring simultaneously indicate a growing risk of conflict among the analysed communities. From the point of view of the presented study, the most essential was an increase in frequency of metal deposits falling in Late Bronze Age. Also other phenomena increased at that time: development of fortified buildings (Chochorowski 1993: 217-218; Harding 2000: 296; Osgood, Monks and Toms 2000: 141-144; Niesiolsówka-Wędzka 1974: 27-29, 173-196, fig. 1), the appearance of a system of fields (noticeable by archaeology only in few places in Europe) (Harding 2000: 150-163; Yates 1999) and an increase in the frequency of articles made of bronze that could have functioned as weapons (Blajer 2013, 93-94). All the mentioned phenomena should be connected with a growing importance of the sense of territoriality among the mentioned groups, which was caused by stress increasing along with fast demographic growth of the communities under discussion, which is commonly noted in the archaeological sources (e.g. Kaczmarek 2002: 228-229; Lasak 2001: 425; Michalski 1983: 383; Mierzwiński 1994: 109-110; Ostoj-Zagórska 1982: 121; Przybyla and Blajer 2008: 76; Szamalek 2009: 65, 80; Wesolowski 1996: 31). Similarity between an increase in the number of metal objects deposited in earth and water and the process of intensification of enclose construction at the same time was also noticed in other parts of Europe (Bradley 1998: 21, 139; Harding 2000: 355). The proceeding changes are characteristic and universal, thus forming the basis for a new look at the phenomenon of mass depositing of metal objects.

Forming a new cultural system requires the openness of a community to ideas, as well as people and objects. Then the mobility of the community increases as well, and in consequence, the importance of borders becomes decreased (cf. Kristiansen and Larsson, 2005: 360-361; Mierzwiński 1992: 128; 1994: 102-103). However, as cultural norms and territorial divisions became established, and stress appeared with an increase in the size and numbers of groups, this gave rise to conflicts which in the reality of the described period occurred between territorial or family groups (Claessen 2006: 222-223; Helbling 2006: 116-120; Ostoj-Zagórska 1989: 177). Thereby the importance of divisions, both physical (borders) and symbolic, increased, which entailed the need for more distinct organization of the surrounding world. This was connected with such a behaviour as emphasizing the importance of borders by depositing hoards there. Obviously the scale of this phenomenon, both in respect of the frequency of such hoards and their inventory, was related to the local availability of metal.

The quoted understanding, combining behaviour referring to the physical space (a tendency to clearly outline the borders along with a demographic growth of the described communities) and depositing metal objects in earth, also allows for a wider interpretation of the process of vanishing of this cultural practice (along with the beginnings of La Tène period). On the one hand, significant cultural changes occurred in all Central Europe in that period – the beginning of the La Tène culture – which were related to changes in practices of deposition (Bradley 1998: 161-172). On the other hand, settlement of the described
communities changed gradually, became less intensive. These processes caused that the stress induced by the size of population was reduced. Therefore, one of the factors determining the culture behaviour of the analysed communities in the earlier period (depositing hoards of metal objects) was weakened; thus as a result of both those processes the described custom vanished.

The analysed metal finds are also evidence of cult practices. Their location and specific character met all criteria defining sacred places, and thanks to the conducted researches, it is particularly clear that they meet the criterion of repetitiveness (cf. Makiewicz and Prinke, 1980), they facilitated contacts with “strangers”. Deposited objects could be gifts for the supernatural powers, elements or ancestors. They became particularly essential in the face of tension increasing at the end of the Bronze Age between
increasing groups of people. Such places also constituted symbolic gates, they were supposed to protect communities that had created them against dangers, both real and legendary. They did not allow for mixing of two different orders – “internal” and “external”.

4. SUMMARY

The outlined results of the study and their interpretation explicitly indicate that the data concerning the relationship between places of depositing hoards and other elements of the cultural landscape (perceptible archaeological methods mainly settlements and cemeteries) increase our knowledge about both metal finds and perceiving space by the analysed communities. The presented model is an attempt to combine functions from different spheres of life of ancient communities and to understand them in the context of a wide spectrum of humanistic knowledge. It points the need for of similar studies over finds from other zones, as well as the use of gathered source base (a catalogue of deposits with known location and documented context of discovery) to ponder the question of deposits from the wetland and from settlements and cemeteries (taking into consideration the organization and spatial symbolism of those places).

BIBLIOGRAPHY


PALAEOLANDSCAPE IN THE SANDY LOAM AREA OF FLANDERS (BELGIUM). GEOARCHAEOLOGICAL RESCUE EXCAVATION AT ROESELARE-VLOEDSTRAAT

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ABSTRACT
In the spring and summer of 2015, the “Bureau voor Archeologie, Architectuurhistorie en Cultuurhistorie” (BAAC) performed an archaeological excavation in the municipality of Roeselare (province of West-Flanders, Belgium). Prospective research by means of trenches had revealed the presence of traces from prehistoric, Roman and Medieval times. West of these occupation sites, however, a palaeovalley of the “Krommebeek” was situated, a small obsequent stream that flows from the steep front of the cuesta of Tielt. During the excavation, large soil sections were dug and registered in order to reconstruct the original course of the Krommebeek in historical and prehistoric times. It showed that several small Holocene channels existed within a broad Late-Glacial river valley. The infill of those channels consists of organic peat and alluvial clay. The finds of hazelnuts, prehistoric pottery and a flint tool within the infill of those channels seem to indicate that they were already exploited in prehistoric times, possibly from the Mesolithic period on. Dumps of anthropogenic wooden finds may indicate that there was also interaction between the channels and occupation sites nearby in later times.

Keywords
alluvial geoarchaeology, Malta Convention, Tardiglacial, Holocene, palaeochannels, palaeoenvironmental reconstruction

1. INTRODUCTION
In the spring and summer of 2015, the “Bureau voor Archeologie, Architectuurhistorie en Cultuurhistorie” (BAAC) performed an extensive archaeological excavation in the project area called “Vloedstraat” in the municipality of Roeselare (province of West-Flanders, Belgium). In the spring of 2014, prospective research was executed, as the mainly agricultural area was destined to be developed as an industrial zone in the near future (Deconinck et al. 2014). Following the Malta Convention (1992) and the legislations of the Flemish Government (2015), an archaeological prospection by means of trenches was performed. This revealed the presence of human occupation sites from prehistoric, Roman and Medieval times at several locations in the research area. A full scale excavation of these sites ensued. During the excavation, however, attention was paid not only to the archaeological traces, but also to the pedogenetic and palaeogeographical aspects of the sites and their surrounding landscapes. The research focused heavily on the palaeovalley of the “Krommebeek”, a small brook which runs to the west of the excavated sites and flows as an underfit stream through a broad channel bed which has been formed by a Tardiglacial river system. In Flanders, the course of river beds has often been altered in modern and premodern times in order to fit the functions of the landscape. Archaeological research gives the opportunity to shed a light on the natural and traditional landscape, and man’s interaction with it. In order to investigate the
relationship of the palaeochannels and their subsequent infill to the archaeological sites and the bulk of palaeogeographical and palaeoecological information that they hold, profile transects were made at three separate locations in the valley of the Krommebeek. The preliminary results will be discussed in this conference paper.

Large scale excavations are common in the Low Countries. In the fast changing landscape of the northern part of Belgium (Flanders) and the Netherlands, large parts of the rural areas are being transformed into urbanized and suburbanized landscapes. During this process the traditional landscape is irreversibly transformed, which can potentially also have a large impact on the present ecological values and buried cultural heritage that lies underneath. Apart from the fact that the archaeological record is sometimes (partially) lost, the geological features of the developed areas are often also severely altered. Following the Malta Convention, which was implemented in Flanders in 2015, archaeological research is mandatory when there are reasons to assume that cultural heritage will be destroyed during the building activities at the construction site. This offers not only a chance to record traces from past occupation, but also to gather geological, pedological and palaeoecological data that allow reconstructions of the landscapes in which these people lived.

1.1. Remarks / Methodology

As a result of the prospective research, eighteen zones within the research area were selected for further excavation (Figure 1). Three of these locations (hereafter called site 8, 11 and 15) were situated within or along the boundaries of the palaeovalley of the Krommebeek and selected based on their palaeogeographical characteristics only. The methodology on these sites differed from the other locations. Whereas the occupation sites were excavated by means of an open area excavation, the zones selected for palaeogeographical research were investigated through a number of deep profile transects of several meters long. These long transects were mechanically dug and completely registered, fully described and digitally drawn. Samples were taken for further analysis (palaeoecological research, texture analysis, micromorphology) and OSL-dating. Archaeological finds (artefacts and ecofacts) that were present in the investigated layers were gathered for determination and further conservation. Prior to the digging of the transects, each one of the sites was mechanically drained in order to allow the trenches to be dug at the required depth, which was well into the Tertiary substrate.

The description and interpretation of the sections was performed by the authors of this article. At site 8, the registration and description took place with the kind assistance of Dr. S. Dondeyne from the Department of Earth and Environmental Sciences of the Catholic University of Louvain (KUL).

2. CONTENTS

2.1. Research area and prospective research

The area of research is situated on the steep front of the cuesta of Tielt, which is orientated towards the south, and to the north of the valley of the river Mandel, a tributary of the Leie which flows further to the east. The Krommebeek is a small obsequent stream which flows from the cuesta front into the river Mandel. The Tertiary sediments that form the geological substrate of the cuesta are part of the Member of Kortemark (Formation of Tielt) and consist of very fine, sandy silt to clay of marine origin (Laga et al. 2001: 140). They were deposited in the Middle of Late Ypresian.

According to the geological map of the quaternary stratigraphy, Holocene fluvial deposits with a texture (1) varying from clay to sand and with possible development of peat, outcrop in a large part the west of the research area (profile type 13) (Bogemans, Baeteman 2003). These fluvial sediments sometimes cover Pleistocene eolic sediments varying from sand to sandy loam, but in some cases they lie directly on top
of slope deposits and local fluvial deposits from the Middle or Late Weichselian, with a texture varying from clayish to sandy. To the west and on the eastern flank of the valley of the Krommebeek, a sequence of continental deposits of the Late Weichselian on top of continental deposits of the Middle Weichselian occurs (profile type 11). These are slope deposits and local fluvial sedimentation from the Weichselian that have not been covered by Holocene fluvial deposits. Further to the east, the quaternary lithostratigraphy consists mostly of eolic sediments from the Late Weichselian era (profile type 4). At the top, these sandy or sandy loamy sediments are homogeneous but at a deeper level they show an alternation between sandy and more silty layers. These deposits belong to the so-called Formation of Ghent.

The broad palaeovalley of the Krommebeek is also well visible on the Digital Elevation Model based on LiDAR-data (Light Detection and Ranging) (Fig. 1). It can be observed as a broad channel bed, its width ranging between 30 and 90 m. The height of the surface level in the western part of the research area varies between 20,5 and 22,5 m +TAW (2). In the eastern part of the research area, on the flanks of the valley, the surface level is situated between 22,5 en 24,5 m +TAW. Here the soil consists mostly of Eutric Retisols (Loamic) or Pcc-soils in the Belgian system of soil classification: a moderately dry light sandy loam soil with strongly spotted and crumbled texture B horizon (Ameryckx 1958). In the Krommebeek valley, large areas of Fluvic Gleyic Phaozem exist which are mostly characterized as Efp-soils on the Belgian Soil Map: a very strong gleyic clay soil without profile development. There are no indications for a peat substrate on the soil map, but the organic topsoil of the Efp-soils usually has a peat-like character and contains many rusty spots (Van Ranst, Sys 2000: 283). A clay or sand-clay substrate within 125 cm beneath the surface level appears in the north of the research area, which indicates that the Tertiary sediments of the Ypresian period might be expected at rather undeep levels in the research area.

As mentioned above, the prospective research revealed several occupation sites from multiple periods. A lot of these sites were situated on the dryer soils on the flanks of the valley of the Krommebeek (Deconinck et al. 2014). Because of the presence of the alluvial plain and the topographical and landscape

Fig.1. Location of the research area, the excavation sites and the profile transects (site 8, 11 and 15) on the Digital Elevation Model of Flanders.
variety in the western half of the research area, the trenches were combined with coring, test pits and profile transects, in order to reconstruct the full stratigraphy of the alluvial valley. Five transects of manual corings were made across the alluvial plain (Deconinck et al. 2014: 31-34). Test pits were made on 33 locations in the alluvial valley as well as on the flanks. Eleven large but shallow profile transects (in general less than 2 m below surface level) were made, all of them in the alluvial plain. In general, five sedimentary facies could be identified within the lithostratigraphic sequence (Deconinck et al. 2014: 44-46). The lowest consisted of Tertiary clay of the Member of Kortemark, either in primary or secondary position, which was not always easily distinguishable based on the core samples. A second facies consisted of Weichselian sand to clay from the Pleniglacial, often homogeneous but sometimes revealing cross-stratification and eolic deflation surfaces (desert pavement). A third sedimentary facies was identified as an alluvial deposit from the Tardiglacial and Early Holocene. These sediments consisted mostly of clay and sand and showed more dynamics than the subsequent sedimentary facies, which dated from the second half of the Holocene and corresponded to an alluvial flood plain with rather low dynamics (mostly clay). Both the Tardiglacial and the Holocene sediments could be observed as incisions or gullies with subsequent infills within the Pleniglacial lithostratigraphy. As a fifth sedimentary facies, anthropogenic disturbances, including the archaeological traces, and anthropogenic embankments were identified.

Based on the results of these data, a large Holocene alluvial plain on Tardiglacial incisions was reconstructed with a broad western valley and a smaller eastern one (Deconinck et al. 2014: 61-62). Three locations were selected to make deeper and larger transects, supported by full dewatering, for further analysis, detailed profile study, dating and palaeoecological sampling.

2.2. Site 15

The lithostratigraphy at site 15 (profile transect 8001) was characterized by a high degree of lithological and sedimentological variation at a relatively short distance. The length of the section was approximately 24 meters. The upper part of the profile was formed by a dark brown grayish, recent plough layer or Ap horizon (3). This horizon only measured approximately 30 cm in thickness. No anthropogenic embankments were observed at this location. Underneath the Ap horizon a dark brown gray to gray layer occurred. Within this horizon there was still a small amount of humus illuviation, but in general it could be characterized as a 1Cg horizon. It measured 10 to 50 cm in thickness. Oxidation spots of iron were observed within filled root-formed pores as a result of the presence of pendular water within the unsaturated zone. Underneath this layer there was a second 2Cg horizon at several locations which appeared to be completely of eolic origin. It consisted of non-calcareous, moderately to well sorted, very fine to moderately fine sand (105-210 micron), its color being light yellow gray to orange gray. This layer was well permeable to water, however, at its base some gleyic properties like thin layers of iron-ore related to the stagnation of percolating water, influenced by the presence of an aquitard underneath and resulting in a perched water table, could be observed. As said, the origin of this layer appeared to be entirely eolic. There were no visible characteristics that could be attributed to subsequent sediment reworking or fluvial redeposition.

The aforementioned aquitard was formed by the peat-like and clayish infills of two Holocene gullies, as well as by a sandy layer consisting of ultra fine (50-105 micron), calcareous, laminated, light orange gray to gray loamy sand. The upper part consisted of a thin clay layer (3Cg horizon), which was the reason for the formation of the perched water table. At the base of the facies, layers of coarser sands with shells and sandstone fragments appeared, indicating an event of mass movement at the formation of the fluvioperiglacial channel. Because of its properties (laminae, ripples, plug-flow deposits, fining upward sequence) it can be concluded that the whole sedimentary facies was deposited under fluvial conditions with variable flow dynamics and current speed. Two gullies with infills of dark green gray gyttja (a lake deposit) at its base and a peat layer with a lot of wood fragments on top were registered in the section. They lay directly on top of blue-coloured plug-flow deposits that have been formed under turbulent conditions.
At the base of the profile transect, the Tertiary substrate was reached at a depth of approximately 2.5 m below surface level. It consisted of laminated dark green gray clay with some sublayers of heavy clay. These deposits belonged to the Member of Kortemark (Formation of Tielt) and could be characterized as marine sediments dating from the Ypresian.

The boundary with the quaternary deposits lying above was very sharp, indicating that the Tertiary sediment was probably eroded at the formation of the fluvioperiglacial channel of the Krommebeek, which probably has started during the Tardiglacial.

2.3. Site 8

The profile at site 8 (profile transect 5401) was the longest and deepest of the transects, measuring approximately 38 m in length and being approximately 3 m deep (Fig.2). The topsoil was formed by a rather thin Ap horizon, consisting of moderately coarse (210-300 micron), humus-rich, dark brown gray sand. It was only 20 to 25 cm thick, probably indicating that the area historically has almost always consisted of wet grasslands and meadows and never really has been put to agricultural use. Underneath the Ap horizon there was a great amount of lithological, sedimentological and pedogenetical variation at different locations along the section. At the westernmost edge of the profile, the lithology of the parent material consisted of rather homogeneous sandy to sandy loamy layers in which a soil in the form of a Bw-horizont had developed. The top layers of this sedimentary facies consisted of moderately coarse, moderately loamy, yellow brown to white brown sands (1Bw- and 2Bw-horizont), measuring approximately 40 cm in thickness. These sandy deposits seemed to be of eolic origin and there were no visible signs of fluvial redeposition. At this location the profile showed a tendency of coarsening upward. Underneath the sandy facies a more loamy substrate appeared, consisting of light gray to orange gray sandy loam (1Cg- and 2Cg-horizont). The total thickness of this sedimentary facies was approximately 70 cm. Again the overall appearance of these deposits was very homogeneous, with no signs of fluvial dynamics or redeposition. At a depth of 1.3 metre beneath surface level, a layer consisting of light gray, calcareous, ultra silty clay with only a few remaining oxidation spots of iron started (3Cg horizon) before it became fully reduced (4Cr horizon). It was 70 cm thick and seperated by a sharp boundary from the underlying layers of more permeable sandy clay which were at first fully oxidated, consisting of orange sandy clay at the top, but in the lower part turning sharply into completely reduced, green blue-coloured, calcareous sandy clay with both clayish and sandy sublayers. These laminated deposits can be interpreted as the Tertiary marine sediments of the Formation of Tielt.

In the central and largest part of the profile transect a very different stratigraphy could be observed. Again several gullies could be observed, now counting no less than six in total with one case of renewed incision at a later stage. The two broadest gullies appeared both on the western and eastern edge of the profile transect, both measuring approximately 6.5 m in width, with a third one being up to 6 m wide. The two largest gullies again showed a sequence of gyttja at the base and a subsequent infill of peat with wood fragments, which seemed to be lacking in the other ones as they were filled up with peat only and in some cases with laminated sandy layers at the top, suggesting a highly active and dynamic phase for at least two of the gullies after which they were completely filled up and eventually abandoned. In between the gullies there appeared a rather complex stratigraphy of sandy layers of which the detailed nature is yet to be fully examined, all of this in relation to the results of the pollen analysis and dating techniques. Based on their characteristics such as laminae, ripples and cross-bedding, these layers generally seem to have a fluvial origin. These fluvial deposits lay directly on top of layers of calcareous sandy clay of Tertiary origin. At the final stage, almost all of the gullies seem to have been covered with one or several layers of ultra silty or sandy alluvial clay, resulting from a flooding of the area during the Holocene. In one case there is an indication that, at the final stage, the gully was manually filled up with sandy material. At the easternmost side of the profile, the broadest gully was flanked by a sequence of sandy layers of approximately 190
Fig. 2. Profile transect 5401 at site 8.
cm thick, which were strongly laminated and appeared to be of fluvial origin. No boundary of the valley consisting of eolic deposits was found on this side of the profile transect.

During the digging of the profile transects, large quantities of hazelnut shells and a stone tool (yet to be examined) were found in the peatish infill of the westernmost gully. This seems to indicate that the Holocene channel beds and the wetlands surrounding it were frequented by man, possibly during the Mesolithic era in the first half of the Holocene (10750-6850 BP). Wooden artefacts were also found in the infill of other gullies. Further dating and elaboration of the excavation results may reveal more about the relationship between the wetland environment of the Krommebeek valley and the human occupation which was surrounding it. It may also shed light on the diachronous preference evolution of occupation sites and site types within the research area, as the rather extensive scale of both the excavations and the prospective research made an archaeological sample of occupation sites in different landscape types possible. Comparisons with other sites in the region will have to be made.

2.4. Site 11

At site 11 two shorter sections were made (profile transects 6001 and 6002), measuring 8 and 11 metres respectively (Fig.3). Contrary to the previously discussed sections, no infills with layers consisting of peat or gyttja were found in these transects. In section 6001, however, a gully was recorded with an infill which consisted of a sequence of several laminated cross-beds of sandy loam or loamy sand with sandy or clayish sublayers. This strong laminated sequence indicates highly dynamic fluvial conditions, of which the precise nature remains to be established. Even though laminated deposits are commonly attested within the broad palaeovalley of the Krommebeek, the rather small dimensions of the channel and the subsequent infills at the same location seem to suggest a later date than that of Tardiglacial river system. A laminated sandy facies was also recorded in some of the gullies at site 8, which appear to have taken place after they were filled up with peat. There seems to have been a reactivation of these channels, which may be seen in relation to the deforestation of the surrounding landscape from 4000 BP onward, and the subsequent increase in run-off, which may have led to higher flow rates in the hydrological system (Verbruggen et al. 1991: 371). The gully in section 6001 lay within a broader complex of loamy sands and sandy loam, which were also attested in profile 6002 and seem to be of fluvioperiglacial origin.

3. CONCLUSIONS

Over the past few years, project archaeology related to large construction sites and land development has gained great importance in the northern part of Belgium, as the landscape of this densely populated area is fastly suburbanizing and industrializing. The recent implementation of the Malta Convention in the Flemish legislation has severely added to the quantity of archaeological excavations that have been performed over the last decade. Though Malta archaeology up till now has concentrated mostly on the prospection and preservation – be it in situ or ex situ – of human occupation sites, it also offers an enormous opportunity to study old landscapes and past environments. Not unlike the archaeological traces of human activity in the past, these geological, palaeogeographical and palaeoenvironmental values are disappearing from the landscape at a fast rate and the information stored within them is forever lost to future generations. At Roeselare Vloedstraat, the opportunity was seized to combine an extensive excavation of several occupation sites from multiple periods with the study of the unoccupied wetlands within the large research area, that encompassed variable landscape types. A complex system of fluvial channel beds from the Tardiglacial and gullies with infills of gyttja and peat from the Holocene was revealed and recorded in detail.

Future research will focus on palaeoenvironmental analysis as well as further dating to establish a more detailed picture of the formation of the landscape and the palaeoenvironment. Artefacts and ecofacts that
Fig. 3. Profile transects 6001 and 6002 at site 11.
have been found in the organic infills of the Holocene gully system may shed some light on the human exploration of the old landscape and its attitude towards it. Large scale excavations on extensive research areas in the future may create further opportunities for a diachronous approach of the landscape and an analysis of the importance of its various components and subsystems throughout the ages.

NOTES
[1] Texture classes were determined using the feel method and following the Dutch NEN 5104 system for the classification of soil samples.
[2] TAW = Tweede Algemene Waterpassing, an altitude reference value which corresponds to the average sea level at low tide in the coastal town of Ostend (Belgium).

BIBLIOGRAPHY
IN THE LANDSCAPE OF THE BORDERLAND. THE CASE OF THE GUSTOW GROUP IN THE EARLY ROMAN PERIOD

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ABSTRACT
The article will discuss an anthropological category of landscape in studies of cultural phenomena, which were peculiar to Western Pomerania region and north-eastern part of Mecklenburg in the early Roman Period (phases B1-B2/C1a). According to Ryszard Wołągiewicz, at the crossroads of Wielbark Culture and the Elbe cultural circle with participation of Scandinavian components had originated so-called Gustow group as one of syncretic archaeological groups and cultures distinguished in the Oder region at that time. The key to understand these relations is to interpret the significance and role of the landscape in the context of culture-generating. Specificity of the Oder estuary and near-by Baltic's islands region was undoubtedly important factor shaping the way of integration different elements of culture that a certain part of inhabitants presumably adopted and manifested as their own. Moreover, some socio-cultural phenomena (e.g. isolated rich graves and small cemeteries, but also certain settlements rules and forms of economic activity) was inseparably connected with culture-generating capability of natural landscape. This category establishes new ways of description of the culture in question, referring to the latest researches (including an attempt to consider that people as a part of tribal conglomerate of the Wielbark Culture). In other words, due to the fact that the basis for taxonomic classification of the Gustow group is discredited recently, the idea of the cultural landscape of the borderland appears to be relevant and helpful for studying that question. For that reason the author will bring up elementary problems (including a significance of the Lower Oder Valley as the cultural border, as well as a role of the southern Baltic coastline in the communication between local groups of people during 1st and 2nd centuries AD) in light of cultural anthropology.

Keywords
Roman period, the Gustow group, the Oder River, Baltic region, borderland

1. INTRODUCTION
At the beginning of the 1st century AD exceptional changes in material culture have taken place in the Western Pomerania and northeastern part of Mecklenburg (Fig. 1). As a result of various factors, including both external pulses (mainly Roman influences) and some local-background properties (internal traditions, as well as conditions enabling inhabitants to adopt different cultural patterns), a typical heterogeneous sphere was shaped in the Central European Barbaricum (Machajewski 2005:190). In general, the Oder Lagoon with the near-by coast and islands on the south Baltic Sea area (Wolin, Usedom and Rügen) have outlined a zone inside of which people had an extraordinary range of complex relationship (Leube 2010, Schuster 2010:207-214). This is where, as Ryszard Wołągiewicz (1933-1994) has determined, so-called the Gustow Group as one of syncretic groups in the Oder region had its origin (1). Based on local substrate of the Jastorf Culture, it had been formed at the crossroads of the Wielbark Culture and the Elbe cultural circle with participation of Scandinavian components (Wołągiewicz 1981:201-205, tabl. XXVIII).

The people of the Gustow Group used to practice the bi-ritual funeral rite with the prevalence of inhumation in the case of aristocratic rich graves (e.g. Lubieszewo) as a cross-cultural phenomenon
Weaponless burials were equipped with typically female costume constituents including mostly bronze brooches and belt elements, as well as S-shaped clasps or pendants made of silver or gold, which had characteristics of the “baroque” style in the phase B2/C1a (Leube 2010: 103-105; Madyda-Legutko 1988; Mączyńska 1985: 96; Schuster 2006: 434, Fig. 4; Wołągiewicz 1974: 132). Practically all mentioned features (especially eastern series of brooches, e.g. the Almgren 38-42), as well as typical pottery vessel forms, buildings constructions and a telling absence of iron artifact, make it similar to the Wielbark Culture in the Lubowidz phase (Leube 2010; Machajewski 2011, Wołągiewicz 1981: 165). To contrast with the Pomerania region, however, the shortage of glass beads, the pottery’s decorative technique with using the “tracing wheel” and some types of brooches (the Almgren 26-29) were peculiar to culture in the Elbe basin (Schuster 2006: 434, Fig. 3). In any case, there were several common characteristics of the female costume in the whole north-central part of the Barbaricum in the early Roman Period, so it deals with a problem of that question (Gebühr 1976; Mączyńska 1988: 214-216).

The first phase in the development of that group was a result of the Elbe culture's influence, while the second phase seems to be the illustration of stronger connection with the Eastern Pomerania (Wołągiewicz 1981: 202). A discrete nature of links with Scandinavia is reflected especially in material traces of distinctive habits of local tribes. In the first place, their customs have included the need to express a social status by valuable grave gifts, e.g, imported bronze vessels, silver pins, golden rings, tin mirrors or drinking horns (Schuster 2010: 332).

1.1. Meanings of the frontier

The primary aim of this paper is to show the borderland as an area with a huge culture-generating capability (Parker 2006: 87). Additionally, a very important question is how to study cultural diversity which is specific to the frontier landscape, where borderlines between archaeological cultures are unclear and hard to draw. Given the dynamic social conditions of frontier contexts – as the literature says and shows clearly – one may not expect to observe sharp boundaries between neat clusters emblemic artifacts (Lighfoot and Martinez 1995: 480).

Attempting to answer that question may be an opportunity to 'transgress' (but not to abandon) traditional terms related to taxonomy of the central-eastern Barbaricum in the Roman Period and, as a consequence,
to apply some interdisciplinary conceptions about space and place in the prahistory. In order to explain mechanisms of some processes (e.g. adaptation of cross-cultural patterns, acculturation, migration and other ways of transformation of the barbarian societies identity) happening there, it is essential to start with a description of this unique geo-cultural niche (Ilves 2004: 163-164; Parker 2006: 83). Starting from archaeological sources with environmental information, including land forms, a type of river mouth and sea coast, watersheds system etc., it will be possible to undertake a further research (Lightfoot and Martinez 1995: 485; Parker 2006: 87-88). This should be focused primarily on the meaning of frontiers in the development of culture.

1.2. Constructing a different approach

The borderland is a particular cultural construct which are being shaped and transformed by people, but it also has an impact on society on its own (Parker 2006: 77). To put it simply, a cultural landscape, as Kristin Ilves rightly says, is an interaction between human being and landscape (Ilves 2004: 165). Such an interpretation of the human-landscape relationship and all symbolic, social or economic implications of that, must therefore be made with reference to proposals offering from cultural studies, including anthropology and sociology.

On account of that, the issue of the Gustow group may well be some starting point for description of a full range of phenomena in the Oder Valley, which archaeologists can not clearly categorize. It relates, in particular, to the problem of Scandinavia-Pomerania links, the nature of which was quite different from the interconnectedness of regions in the central Europe at that time (Kaczanowski 2010: 56). It also seems to be necessary to take into account the increasing dynamism of cultural adaptation, especially in case of connections between the Eastern and Western Pomerania in the origin of the Gustow group.

The Polish archaeological studies tradition has included a micro-regional research, which was based on demarcating borders of settlement groups in distinctive parts of the natural landscape (Leciejewicz 1996: 11). Such an investigation is therefore the proposal made by Henryk Machajewski in a number of his papers (Machajewski 1981: 26; 2010: 203). It appears as a needful project, but it should be extended to some supplementary postulates. Anthropological categories such as “communicative community”, but even “cultural-linguistic group”, “local society” and others turns out to be relevant and crucial for that issue (Kaczanowski 2010: 53; Machajewski 2005: 181; Ostoja-Zagórski, Posern-Zielinski 1977: 39-71; Parczewski 2000: 207-208). Then, and only then, under the interpretation with these terms, will it be possible to consider the space of borderland in the Gustow group context as the backdrop to people’s behavior and development of exceptional forms of material culture.

2. THE HUMAN-LANDSCAPE RELATION

Look at this instance as a model of entanglements of nature and culture. It is generally obvious that some geographic features, such as rivers, standing waterbodies, mountains, marshes or woodlands and other “wild” frontiers shaped on the Earth’s surface, can determine people’s activity in a certain way (Vedru 2004: 184; Edgeworth 2011: 11). Meanwhile components of water-landscape, as rivers, lakes or parts of sea basins, should not be always recognized to be boundaries in the “obstacle” meaning, but also to be lines of communication or zones of cross-cultural interaction (Leciejewicz 1996: 9-10; Parker 2006: 83).

The region in question is being formed by the downstream water powered by fluvial and maritime currents affecting together, so it should rather be labelled as a part of maritime landscape. Remarkably, crossing the broad, shallow water of the Oder estuary differs widely from an act of overcoming deep beds in the middle course of that river (e.g. in the Lower Silesia region). Therefore, the sea and the river water and its streams are equally valid factors of socio-cultural development.
2.1. The physical landscape and its attributes

The coastal landscape – regarding to the Pomeranian Bay coastline’s case – is defined as a system of landscaping elements which are able to form a typical topography of place located in the frontier area between sea and land, whereas such an area is still exposed to the influence of hydrometeorological, biological and anthropological factors (Furmańczyk and Dudzińska 2003: 80).

The variegated surface relief of the Central European Lowland had been shaped as a consequence of the Weichselian glaciation (115,000 - 11,700 years ago). This is characterized by morain hills, glacial erratics, ribbon lakes (in the hinterland) and various landforms as effects of erosion (including glacial, water and eolian agency), accumulation or denudation processes (Furmańczyk and Dudzińska 2003: 80; Leciejewicz 1996: 10; Rogalski 2010: 31). Although that area is dominated a little rich soil being produced from glacial tills, sandy loam or gravel, the closeness of the water, as well as other conditions for defense or an effective communication could have outweighed some impediments. In contrast to the eastern section of the shore with cryptodepressions in the Wolin-region and coastal lakes between the Oder and Parsęta rivers, a strongly varied coastline sets the western side of the Oder apart. This relates to the presence of the Daars Peninsula, islands Usedom, Rügen together with Hiddensee and, in general, the coastal curvature as a result of numerous capes with steep cliffs or small bays encroaching upon the land. The Sea level had been risen significantly in last two thousand years, so that an unknown number of sites, especially in the Szczecin sea-coast region, probably stay underwater (Machajewski 2005: 182; Schuster 2010: 211).

The Oder does not create a typical delta area; it is rather a kind of the lagoon estuary with two large islands, Wolin and Usedom, as products of the high river sediments accumulation. These islands, divided by Świna River with its delta, and surrounded by Dziwna and Peene straits, are densely strewn with post-glacial water holes (Osadczuk 2003: 90, Fig. 3; Uścinowicz 2003: 62, Fig. 52). According to some medieval sources (e.g. History of the archbishops of Hamburg-Bremen by Adam of Bremen), territories around the Oder estuary had been strongly swamped plains in the Early Middle Ages and it is to be supposed that marshes must have been an important feature of that landscape in first centuries AD (Morawiec 2010 ). This can be generally said about the whole lower section of the Oder Valley, which is divided into different streams. Aside from the Oder, a row of minor rivers (Rega, Parsęta, Barthe, Recknitz and Warnow) discharges to the Baltic Sea. The first two, based on archaeological data, had a particularly great importance in the initial settlement of the romanized culture. The micro-region around the Parsęta river, as the barrier divided the Middle and Western Pomerania, was a zone distinguished by its high environmental productiveness with the Wielbark culture settlement domination at that time (Machajewski 1981: 34-46). The swamped Rega valley, thereafter, connects forested lakelands, where it has its source, with the Baltic shore, so it seems to play a role as the difficult-to-access and safe area (Cedro 2003: 47-49 ). During the Iron Age, in the German part of Pomerania and Mecklenburg region some different directions of the culture development could have been being determined by specifically dense woods and marshes. That environmental barrier has led to cut off the coastal area, as a distinct ecological zone, from the Elbe basin at that time (Leube 1976: 357).

The next important issue is the close geographical proximity of the Danish Islands with territories in question. Basically, from the Hidensee it is about 50 kilometers by sea route to the Møn island; there is exactly the same distance between the southern cape of the Falster island and the Warnow river estuary, but the Daars Peninsula is just located only 35 kilometers from the Falster (Leube 1975: 235). Special attention has to be brought also to the morphological similarity of the terrain relief and natural environment conditions in the whole south-western part of the Baltic Sea basin. In the light of some analogous components of landscape (e.g. types of coasts, vegetation and woodlands), Rügen and Hiddensee (and to a lesser extent, Wolin or Usedom) become comparable to Lolland, Møn, Falster or even Bornholm islands.
2.2. The Western-Pomeranian cultural landscape in 1st and 2nd centuries AD

Generally speaking, there is one further point that an every act of cognition of the special landscape lead directly to forming the mental landscape of people (Furmańczyk and Dudzińska 2003: 79-80). This way, it shapes their basic core knowledge of the world (Woźny 1996: 162).

The culture under investigation is the illustration of diversity and exceptional cultural richness. Furthermore, there is every reason to conclude that material remains with their practical and symbolic meaning are products of men's relationship to the maritime and river landscape. The question is, however, how to describe nonmaterial products of that (Ilves 2004: 165-166)? By extension, it is important to notice that waterbodies as parts of landscape are relatively constant elements in space and time, so they can be perceived in similar way by people living over the course of centuries (Tilley 1994: 11; Woźny 1996: 145-150). These places seem to be some kind of “creative agency”, that enables human being to give to nature a form of culture by repeatable mechanism of perception. The possible ways of using the maritime landscape – either in ancient, or present times – result from a typical “seaman's perspective” (Ilves 2004: 167-170). Likewise, also (...) the importance of rivers (...) to humans seems to be universal – as Gurly Vedru says in his research paper about the prahistoric settlement around rivers in the North Estonia (Vedru 2004: 184). All in all, the one thing is sure: if we want to understand some distinctive cultural mechanisms, even the non-sources knowledge connected with the phenomenology of landscape could not be ignored.

Specific problems, as Ilves states, may arise with regard to trying to “recostruct” the seaman's perspective in the context of the past (Ilves 2004: 167). Then we ought to take into account all knowledge of natural processes which could have had an impact on the enrivonment, as well as mankind's presence in space and its ways of living by using physical/psychical ideas connected with that landscape (Ibidem: 165). Of course, some intellectual (beliefs, myths, memories, place names) and sensory aspects of cultural landscape (smells, hearing, taste) can be therefore subjected either to the ethno-archaeological interpretation or, regrettably, only presumptions and questionable hypotesis based mainly on the comparative studies (Ilves 2006: 95-98; Posern-Zielinski and Ostoja-Zagórski 1977: 47-48).

2.2.1. A message from the borderland

On the grounds of environmental data concerning the Western Pomerania region and north-eastern frontiers of the Mecklenburg, it needs to be said that conditions for the development of settlements are adequately favourable. Given their particular strategic location, territories around the lower part of the Oder river must have been attractive for people settled here and having a capacity to express their cultural and social differences.

The period referred to in that paper was characterized by unrests and more dynamic changes in barbarian tribes settlements. A convenient communication location giving a possibility to defend was probably a decisive and crucial factor in choosing places to live. Therefore, due to the fact that inhabitants of distinctive regions have needed to adapt to environment unceasingly, a process of archaeological interpretation is so problematic and the question of taxonomical divisions in the mid-European Barbaricum leads to unclarity and difficulties (Schuster 2006).

The origin of the Gustow group was an effect of the coastal zone isolation, due to the Suebian tribes consolidation in the Elbe Basin, which is also mentioned in the Germania by Tacitus. The densely forested and sloughy area of the Mecklenburg Lakeland has contributed to weakening of relationships with the Romanized Elbe culture, however genetic ties with that have been still apparent (Leube 1976: 357; Wolażewicz 1981: 143, 200). Exposed to northern and eastern influences, this part of Pomerania was a zone of forming new regional alliances.

According to published research papers, most sites associated with the people of the Gustow group are small cemeteries or single sepulchral objects, and there is a clear shortage of settlements remains
It may be expected that a disproportion between both types of data is due to incomplete sources, but the instability of settlements as another reason for that situation should not be underestimated. Indeed, some phenomena, such as birternal cemeteries divided into parts illustrating short time horizons, signalize a very high rate of changes in the heterogeneous and differentiated settlement structure. Among them were cemeteries in Gustow (four small groups of graves – Fig. 2) and Poseritz (two groups) on the coast of Rügen, but also a spectacular sepulchral complex in Lubieszewo consisting of a flat burial ground as an evidence of the initial stage of the culture, as well as two clusters of elite graves: the first, dated to the phase B1a-b, where both flat burials and barrows were discovered (Sandberg) and the second (Tunnehult), from the phase B2b-c, with only burial mounds (Eggers 1953; Herfert and Leube 1967: 221, Fig. 174; Schuster 2010; Sommer-Scheffler 1998). It can probably be said that also a small cemetery in Kunowo (Stargard County) at the Miedwie Lake reflects the dynamic of changes occurring in the Lower Oder Valley (Żychliński 2009). Despite the distance between this area and the dense territory of the Gustow group, people coming from the coastal zone may have been able to infiltrate the surrounding lands.

2.2.2. The importance of the water

Although there are relatively few settlements data, it can reasonably be assumed that people used to settle themselves near water courses (Leube 2010: 96). However, a highly interesting is the fact that the proximity of the water or presence of high points in the landscape, where one could see the water, appear to have been also two main key determinants of choosing a place to set up cemeteries. It was preferred to bury dead people on nearby small rivers, in wetland areas (Lubieszewo), shores of the sea and lakes. It is difficult to say whether this was due to the closeness to the residential areas, possibilities of contact between groups of people or – in general – some special meaning of the water (Woźny 1996). For instance, the Parsęta river was allegedly a line of different culture communication in the Iron Age and it is characterized by series of sepulchral sites which are difficult to classify from a taxonomical point of view (Machajewski 1981). On Rügen, thereafter, settlers’ groups probably have avoided infertile and forested lands in the heart of the island and they have preferred shores of internal waters to rocky coast (Leube 1997: 757-758, Fig. 1). Meanwhile, a number of Rügen burials have been set up in cliffs. What was the reason of that?

The same comment applies individual, isolated rich burials, mostly skeletal and endowed chiefly with Roman vessels. Generally, these grave-sites were located in special places, such as hills in continental margins, on islands coasts and also at lakes or straits. Example of this can be the female grave in Sierosław (Wolin island, Poland) containing, among other artifacts, a rare bronze belt ending of the Scandinavian provenance as the phase B1a indicator (Stąporek 2006: 204). Based on the description of discover from the year 1892, the burial, covered by stones, had been situated on the hill (germ. Klinkowberg) over
the broad wet meadow, nearby the Dziwna strait (Schumann 1892: 499). The grave from the phase B2a in Wilhelmshof (Usedom island, Germany – Fig. 3), with metal vessels only, as well as a somewhat older burial in Mellenthin (Usedom) had been just similarly located (Stange 1988: 132). Finally, we are not fully aware of the reason behind placing burial with the pair of drinking horns and a single brooch (suggesting a turn of the phase B1b/B2a) on the edge of valley linking two lakes in Troszyn (Kamień county), which is also elevated point in the lagoon landscape (Machajewski 2010: 357-368, Fig. 1). Another striking (although latter, dated to phase B2/C1a) example is an exceptionally rich female skeletal grave in Kloster on the Hiddensee, discovered in the cliff shore part as a destroyed object(4). It illustrates the general change which has been in the course of development the culture in that region, consisting of significant shift the center of wealth from the Rega Valley (Lubieszewo, Gryfice County) towards the Rügen island and its surrounding due to the intensification of ties with Scandinavia by military and marriage alliances (Schuster 2010: 337). In theory, placing the burial on the coast, which borders the Møn and Falster islands over the sea, could have been an ethnic identity expression of that woman (Leube 1997: 769-766; Schuster 2011: 314-315, Fig. 11).

Isolated single graves, especially in the beginning of the Roman Period, as evidences of social stratification may have been results of inhabitants’ inability to adapt some different cultural patterns being preferred by elites, as well as – according to Henryk Machajewski – effects of the social exclusion in the case of foreigners’ immigration (Machajewski 2010: 363-364). Nevertheless, there was also the need to signalize these social differences in the space with using features of the natural landscape (apart from the issue of marking rich graves by burial mounds, stones constructions and other artifacts). We can only suppose that isolated graves had a special role to play, perhaps as landmarks or peculiar signs in the symbolic space, but however these objects should be treated as representations of some cultural quality in the first place. And last but not least, although reconstructing and interpretation of religious beliefs is impossible in that case, the water as a part of natural landscape should be considered to be a significant component of symbolic culture (Woźny 1996: 150-160).

2.2.3. The Scandinavian issue

It is noticeable that skeletal burials in this coastal zone (as opposed to the hinterland, for instance) were characterized by the orientation North-South with heads toward North, which was in general very common in the Pomerania region (Gebühr 1976: 70; Leube 1970: 149). The relevance of the connections with the people from the North appear to be the key context in that study. By the way, it also gives us chances of understanding other cultural practices specific to local society (Leube 2010: 107; Schuster 2010: 332).

In spite of the Wołągiewicz's claims that the Gustow group had the most markedly continental character, it seems appropriate to agree with the theory of certain common behaviors of people living on islands of the Danish Straits and inhabitants of the south-western Baltic coastal area (Schuster 2010).
On the background of their ethnic characteristics as elements of non-material culture, all they perhaps created typical network of communicative communities. In the case of the Gustow group people, strategic, in many ways, localization in the borderland have facilitated access to trade routes, as well as enabled to craft and economic development. Because of port conditions, a diversified shoreline in this part of the Baltic coast has encouraged construction of harbors and brokering goods. In fact, during that time the southern Scandinavia has been the focal point of the Roman imports distribution in this part of Europe, but also an important center of craft production, which could have affected the rise in wealth among representatives of local elites. Inhabitants of the West-Pomerania region, as intermediaries, were therefore able to take advantages of that neighborhood. In some way, these contacts (expressed e.g. in rich burials and cemeteries from the 2nd century AD, such as “Wzgórze Młynówka” in Wolin or female grave in Kloster) were a prelude to the origin of the Dębczyno Group, strongly influenced by Scandinavian culture (Machajewski 1995).

2.2.4. The question of the Wielbark Culture’s role

Due to the similarity and close links between the Gustow group and the Wielbark Culture in the first stages of its development, it is proposed that both them should be classify as the same one. In the whole region of Pomerania, according to Jan Schuster, the material culture have been almost totally aligned as a result of acculturation (Schuster 2006: 434, Fig. 14). At the beginning of the Roman Period, as he claims, there were no significant movements of the population on described area; an inflow of people has not happened, so it could not have been the reason of changing. However, although the acculturation seems to be a fine explanation of the material culture problem, the question arise: does the landscape really matter?

The cultural separateness and individuality of that region, on the one hand, seems to suggest us to not treat equally the whole southern part of the Baltic coast. On the other hand, the specificity of the Wielbark Culture generally consisted of the ethnic diversity within that culture. The Goths – as newcomers from the Scandinavia – had consolidated local groups of people (mainly the Oksywie Culture) and given them new cultural patterns, so – in theory – a comparable situation could have existed in the present case, on the Jastorf Oder group area.

Of course, as it results from the research, the people of the Wielbark Culture participated in the genesis and development of the Gustow group, because of the borderland conditions and high dynamics of cultural processes. All these tribes has been in constant contact, both at the Parsęta River and on the Rügen island, but – and it is the most important note here – along with the changing natural landscape, the cultural landscape were also evolving. Therefore, even if artifacts were identical, the Wielbark culture in the Lower Vistula Valley and its “relative” in the Oder Estuary and nearby islands can not be described in the same way. Similarly, the people who have moved towards to the Black Sea and a part of the population which have begun to migrate to the Oder region in the 2nd century AD are not fully comparable. We should not identify an alignment of material remains with other aspects of culture.

3. CONCLUSIONS

Basically, the purpose of that paper was to look at the Gustow group issue in a bit different way, beyond the problem of its taxonomical classification. There was, of course, one of possible ways of studying romanized cultures in border zones of the European Barbaricum, especially the Oder region and areas around the south-western part of the Baltic Sea Basin.

The author is fully aware of the fact that it is impossible to reconstruct and interpret certain elements of ancient cultures, including peoples behaviours, customs and their beliefs. However, there are some contexts, such as the landscape question, which can reveal the human universal viewpoint and give us
an opportunity to describe material remains by using other instruments and terms. That way should be therefore perceived as a further small step towards to discovering and explaining the specificity of culture formed in the first centuries AD in territories of the central Europe.

NOTES
[1] A settlement system which was formed in the Oder region and northern parts of neighboring Lake-lands, has distinguished itself as a heterogeneous and differentiated structure. Distinctive sections of that varied in many aspects of culture, including way and degree of the foreign patterns reception.
[2] This region has been divided into a number of local units and areas of dense concentration of settlements, e.g. Lebus Group in the Myślibórz Lakeland, set of sites in the Pyritz region, Tollense and Rachow Groups in the Mecklenburg Lakeland in the early Roman Period, as well as Dębczyno Group which had originated in place of Gustow Group and Luboszycze Culture in the central position of the Oder River in following parts of this period (Machajewski 2005).
[3] That principle is confirmed by local names of sites, e.g. the Rügen “Mühlenberg” in Gustow and the same one in Varbelvitz, or hills in the Wolin Island: “Wzgórze Młynówka” and “Wzgórze Wisielców”.
[4] The burial was endowed, among others, with precious elements of costume, including three (!) buckles which could have been additional burial gifts indicating a higher social status. Similar combinations of elements are found in Juellinge (Lolland Island) and in Norway and Funen (Mączyńska 1985: 96).

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Etnologii, pp. 9–12.


ABSTRACT

The article is based upon the results of Ljubuški Archaeological Project, a non-invasive archaeological survey in the općina (municipality) Ljubuški, Bosnia and Herzegovina. The project collected and verified in field data from existing publications, plus expanded them with the use of modern technologies, such as aerial photography, satellite images and precise localization of archaeological finds using GPS devices; all acquired data was combined in a GIS database. Additional, indirect information on the settlement in antiquity was drawn from analyzing the epigraphic evidence. This allowed a thorough reconstruction of the ancient cultural landscape in the area. It became obvious from the analysis that in the region one site had a special position and role: the site Gračine, which was the garrison place of auxiliary troops. Around it a complex, composite settlement developed, consisting of zones with various uses, acting as a core in the life of the whole Trebižat river valley. It also played a significant role in a broader cultural landscape context due to its location on a road vital for the whole province Dalmatia and the importance for the safety of the regional centre Narona.

Keywords
archaeology, non-invasive survey, Roman, settlement, army

1. INTRODUCTION

1.1. Ljubuški Archaeological Project

The article is based upon observations made during the realization of Ljubuški Archaeological Project, a non-invasive archaeological survey conducted in the općina (municipality) Ljubuški, West Herzegovina Canton, Bosnia and Herzegovina, between 1 and 14 October 2015 (note 1). The aim of the project was to gather and verify the available data on the Roman and Late Antique settlement in the area. The use of modern administrative borders finds justification, as the area is in itself a geographically well-defined area, consisting of the valley of river Trebižat (note 2) and its tributaries plus the surrounding hills and highlands. The importance of this undertaking lies in the specific situation of archaeology in Bosnia and Herzegovina; the local archaeological community only recently started to recover from a long brake caused by the civil war of the 90s, which resulted in the number of active archaeologists and cultural heritage funding dropping to an extremely low level (Lawler 2010). Even though most of the sites in the country have been inventoried (ALBIH 1988) the project was the first implementation of methodological advancements of settlement archaeology and non-invasive surveys and the application of most recent technologies in the area. Due to the issues of protection of archaeological heritage having been largely neglected for several years and the increasing building and construction activities, the project became important also as means
of investigating the current state of preservation of sites and the dangers that threaten the remaining elements of the ancient settlement landscape.

1.2. Methodology of the project

The project consisted of a combination of three main research strategies, fieldwork, a study of epigraphic evidence and integration of data into a GIS database, allowing for a holistic reconstruction of the ancient settlement landscape in the area. The first consisted of locating in terrain archaeological sites reported in earlier publications and their documentation using modern techniques, such as recording the exact location using hand-held GPS and GPS RTK. In addition to this, when the local conditions such as vegetation allowed, the extent where surface material was found was determined, indicating the size and shape of the site. In the existing scientific literature the position of the sites was often given only in approximation, as distance to elements of infrastructure or houses. Moreover, they were frequently reported only as spots, that is without giving enough attention to their extent. The state of preservation, possible dangers, chronology, type of surface material, possible function of the site and its relation to the elements of landscape were also established and documented. This was supplemented with photographic documentation, taken both from ground level and in the case of most important sites, low-altitude aerial photographs from a drone.

The second element of the research project is the epigraphic evidence, which provides information on the social landscape (most often mostly on the richer classes), but also on the settlement landscape of a particular area. However, inscriptions often provide indirect information on the ancient landscape through an approximate location of features such as graveyards (in case of gravestones) or buildings (building inscriptions). Moreover, their findspots also give secondary information on other features; for example the presence of gravestones may indicate that a road was running in close proximity, as the cemeteries were often located along major routes; they also exclude the use of a particular area for human housing in the same period, as a cultural and religious taboo prevented burying the deceased inside settlements.

The collected data was integrated into a GIS database made using the QGIS software. The information from existing publications and the fieldwork was combined with ortophotomaps, satellite images and aerial photographs. The combined data was analyzed in regard to the chronology and function of the sites and their relation to the landscape. The database is currently being expanded with archival aerial photographs and maps, which can provide information on the situation before some major construction works in the area under study. Of special interest for the study of landscape are the maps from the time of the Austro-Hungarian occupation of Bosnia and Herzegovina, which show seasonal lakes and marshes in some parts of the region, which no longer appear due to melioration of the terrain. It is highly probable that they did exist in some form also in antiquity, obviously affecting the patterns of human behavior in relation to the landscape. The database serves not only the project, but will also be used for the management of archaeological heritage and as a starting point for further research of the antique cultural landscape of Ljubuški.

1.3. Scope of the article

Among the most important archaeological sites in the region particular attention must be given to Gračine. Parts of it, with the remains of two buildings, were excavated in the late 70s, but apart from the reports and some preliminary remarks (Atanacković-Salčić 1977; 1978; Bojanovski 1980; 1981) the excavations were never fully published. Still, it is obvious that the site is of high importance not only for the ancient history of Ljubuški, but of the whole region. As such, it is classified as a state-protected monument of culture (note 3). The current study will not attempt to answer the question of the function of the constructions that were found during the excavations, but rather describe the general role of this site within the cultural landscape.
of the area of Ljubuški. Secondly, the article will endeavour to determine the role of Gračine within the broader region, in this case the hinterland of Narona, one of the most important cities in the whole Roman province of Dalmatia, which dominated politically, socially and economically the surrounding areas. In particular, the article will attempt to answer the problem whether Gračine can be considered a sort of central place within a part of the hinterland of Narona.

2. CONTENTS

2.1. Ancient history of the area

The study of the role of site Gračine in the cultural landscape of antiquity is strictly connected with the history of Narona, which is located near the marshy estuary (now mostly filled with sediments) of the river Neretva. The distance between the two sites is some 15 km. However, in between them there is a range of quite steep hills and a narrow zone of rocky highland. Thus Narona and the Trebižat river valley are two separate zones. Narona, a trade emporium, gained on importance through becoming a bridgehead of Roman expansion in this part of the Balkan Peninsula (Zaninović 1980). The city’s loyalty to the Republic and to the winners of civil wars of the first century BC resulted in granting the status of colony at some point between 47 and 27 BC as Colonia Iulia Narona. Due to the river Neretva and its valley providing relatively convenient way of access to the heart of Western Balkans, the city acted as an important exchange spot between the interior and the coastal zone (Cambi 1989), and was a place where trade between the province and overseas concentrated.

Up until the reign of Tiberius the territory of this colony extended into the Trebižat valley. Then a veteran settlement called pagus Scunasticus was established on land which was probably purchased from the city by the emperor to grant to retiring legionaries (Alföldy 1987; Królczyk 2009: 34). One further ancient toponym located in the valley is known: road station Bigeste. The extents of the three entities remain completely unattested by any category of sources. However, regardless of the administrative relations between the various settlements, it is obvious that the whole valley was an immediate hinterland of Narona, perhaps even a kind of suburban area. It can be observed that it was closely connected with the city not only in terms of economy, but also culture and population. What is especially important is that the ancient name of the site Gračine is unknown. In older literature it was believed to be Bigeste (Patsch 1897), however more recent discoveries putting Bigeste in modern Radišići made this theory probably invalid (Bojanovski 1969: 142-144).

2.2. The immediate landscape setting of the site Gračine

The site Gračine is located in the southern suburbs of modern city Ljubuški, in the settlement Humac, circa 100 meters north from the river Trebižat.

It is situated on a relatively flat plateau above the level of the river and the mostly flat bottom of the river valley, the ground slightly rising to north. While the flat areas next to the river are used as fields and meadows, the site is located on a rocky ground. The site is more or less rectangular in shape, limited on its southern, part of western and eastern sides with quite substantial ramparts or, more precisely, unbound mounds of small rocks. The northern side is largely destroyed or covered by modern houses, gardens and a street, making the reconstruction of the whole size of this complex as 110 by 140 m only tentative. Part of the site was also damaged during the Second World War by a crossing column of tanks (Sergejevski 1955: 67). While the ramparts probably acted as field boundaries in the recent past, the presence of rectangular cut stones of Roman workmanship and roof tiles suggests that we are dealing with the remains of walls that were later covered with stones removed from neighbouring fields during agricultural activities. Such practice was standard in the region: fields located next to the remains of ancient buildings yielded large
amounts of stones that had to be removed and dumped somewhere. The places where the walls were visible were chosen, as the complete dismantling of walls was rarely worth the effort. In the middle of the site two buildings have been excavated in the late 70s, but their interpretation and dating is uncertain and requires additional research. They were understood as elements of military fort (Bojanovski 1981; though his interpretation of the buildings as *principia* and barracks of *centuria* is certainly wrong) or an annexe of the fort with baths and house (Basler 1985: 22-23; Dodig 2006). In any case, numerous finds of tiles stamped with the stamps of various Roman military units and pieces of military equipment point to the use of this site as a military base in the first and second century AD. It is also worth noting that even though large sections of the river Trebižat have been regulated, the part next to the site mostly retains its former, natural character, including several low waterfalls, a group of which is located almost on the axis of the structures on the site Gračine.

2.3. Gračine - centre of a composite settlement

However, even though the modern development covers much of the surrounding areas, especially to the north, it is obvious that the site Gračine did not exist in isolation. Traces of various elements of settlements have been recorded in close proximity of the site in various directions; however, not in all cases it was possible to locate and mark those features in the field, due to the changes that happened between the times of discoveries and the Ljubuški Archaeological Project. Additionally, the unsatisfactory past methods of recording the location of discoveries meant that surface finds observed in 2015 could not be undoubtedly linked to features reported earlier.

Still, we were able to determine the existence of zones of settlement on both sides of the river. In an area called Bašćine below the constructions of the site Gračine some architectural remains were already reported (ALBIH 1988: 320, no 25.6). It was suggested that infrastructure for the transport of water from the

Fig. 1. Location of the site Gračine in the valley of Trebižat.
GRAČINE – CENTRAL PLACE IN THE HINTERLAND OF ANCIENT NARONA?

river up to the site Gračine was located here as well (Bojanovski 1985: 93), but this is merely an unfounded hypothesis. Some Roman stones were used in the walls of several older buildings in the broader area. On the southern side of the river, the situation is unfortunately much less clear than in the beginning of the 20th century (Patsch 1907: 55-76) due to the destruction of sites. In Teskera, the surface material was identified as the remains of a settlement and remains of a building were unearthed (Dodig 1985: 102-113; ALBIH 1988: 320, no 25.14). A similar situation existed in the neighbouring Hardomilje (ALBIH 1988: 320, no 25.9; 328, no 25.178; 333, no 25.253; 336, no 25.322; 337, no 25.348). It is probable that the earlier chance finds actually belong to one large complex. We were able to recognize concentrations of archaeological material, especially building material, which probably show the location of underground remains of constructions and concentrations of small pebbles in a line on some of the fields in Hardomilje, in the eastern part of the southern bank, probably destruct of road leading to Narona. Some well-preserved sections of this road are still visible on the several kilometres to the east. Together with several finds of tombstones and other elements of graves it is possible not only to recognize the course of this road as it was drawing near Gračine, but also that it was flanked on both sides by cemeteries. We can assume that this graveyard would be a prestigious location of burial, due to numbers of commuters travelling along the road. Some gravestones were also found in Teskera (Dodig 1985, 102-113). It was suggested that those areas served as the garrison's graveyard (Dodig 1985: 115–117), however, not only active soldiers were buried there. It is our hope to verify the situation on the southern bank of the river during further research.

During periods of drought the remains of pillars of a Roman bridge were visible in the middle of river Trebižat (Patsch 1907: 53-55). While we were unable to verify this, we found large concentrations of Roman building material in two spots on the banks of the river and inside the riverbed, which could possibly represent the remains of bridges or other constructions. It is worth noting that the already mentioned low waterfalls directly in front of the site Gračine could have also been used as crossing places leading to

![Fig.2. Reconstruction of the elements of settlement landscape south of the site Gračine (shown with the extent of ram- parts and structures inside). Dots: concentrations of finds of Roman material. Darker grey: zones used probably mostly for housing / production. Lighter grey: zones used probably mostly as cemeteries. Based on archaeological material visible on the surface in October 2015.](image-url)
Teskera, and their specific form actually would much simplify the construction of a bridge, a practice typical in the region. Somewhere in the area on the right side of the river two building inscriptions (note 4) mentioning the renovations of a temple with portico were found (Dodig 2014: 141-142).

It is obvious from the collected information that the decision to implement the methodological approach of landscape archaeology and of non-invasive surveying is beneficial in terms of the volume of data, but also interpretation of the realities of the past. Rather than several archaeological sites from the Roman period in this relatively small area, each called using a local toponym, we should underline that the whole left and right bank of river Trebižat constitutes a single, albeit complex and composite settlement with various zones of different status and meant for diverse activities, plus very well developed transport infrastructure. Regardless of the exact military status of Gračine, that is whether it was an auxiliary fort or any other garrison (or whether its size and function changed over the course of time), the settlement around it most probably had the character of a military vicus due to the constant contacts between the military and the civilians. The use of the term canabae to call this settlement in the older literature (Ballif and Patsch 1893: 57; again in Dodig 2014: 143) is incorrect, as the military installation was most definitely not a legionary camp. The expectation of the existence of prata legionis in the surrounding area (Dodig 2011: 331) is unfounded for the very same reason; in fact, the use of land by auxiliary units remains little known.

2.4. Role and position within the region

Several factors point to the special role of Gračine and surrounding settlement within the region. Firstly, it is obvious that the position of the site within the valley is of strategic importance. It is centrally located (especially when considering both the valley of Trebižat itself and of its subsidiary stream Studenčica), but it also controls a convenient river crossing.

The main reason behind the presence of soldiers in this spot must have been the defence of Narona (Wilkes 1969: 139-143; Zaninović 1980: 178; Sanader 2002: 123-128) or of the communication routes (Paškvalin 1986: 157). Taking into account the relation with Narona, from the perspective of that city, the site at Gračine is located on the other side of the river, not only protecting the access, but also providing a bridgehead during any offensive action to the north. The lay of the land and politically-social situation was such that in the Roman perspective the valley (and Narona after it) could be threatened almost exclusively from north-west, north or north-east, be it by invading indigenous tribes, or on local scale by the shepherding population of highlands coming into conflict with farmers in the valley over the movement of herds. This was the optimal location for checking in advance any threat or unrest on the outskirts of the valley, and in case of a failure at stopping it there, retreating to the best defensive position at the river crossing. As such, the tactic employed should be viewed not as that of a linear defence of any line or frontier (Wilkes 1977: 245-246 contra Šašel 1992: 398), but rather as one aiming to control zones, with the forward defence zone in the valley and the more important immediate vicinity of Narona.

We can assume that within the settlement landscape of the valley this spot acted as a natural centre due to its position and good communication both within the region and with the larger centres outside of it. One can draw a parallel with the role of the nearby city of Ljubuški in later eras, similarly located next to a military installation - at the foot of a hill with a medieval castle. Needless to say, the importance of the site Gračine was even heightened by the fact that it was located on the key road Narona-Salona (Ballif and Patsch 1897; Pašalić 1960; Bojanovski 1977; 1984) which was vital not only for the movement of armed forces but also transport of goods. In fact, most sites in the northern part of the river valley are located along the line of this road (Bojanovski 1988: 35). The presence of soldiers and their contacts with civilians (Wilkes 2000) resulted in increased commercial activity, the creation of a market for goods and the need for manpower, which stipulated the development of settlement. Thus the site acted as a core around which a regional centre appeared and the settlement in the whole valley organised. It is important to note that the
location of the military installations in a rocky area did not take up the valuable land at the bottom of the valley, showing some concern about the agricultural production in the immediate vicinity. Since attention was given to minute detail, the choice of the place for the military strongpoint must have been preceded by detailed consideration of its position in the landscape. It is interesting to note that after the withdrawal of the unit stationed at Gračine at some point at the end of 2nd / beginning of 3rd century AD (Bojanovski 1985: 67), in the Late Empire and Late Antiquity the settlement complex probably lost its importance. As a final, side note, the cultural role of the site should also not be underestimated: the presence of a large group of auxiliary soldiers coming from a different part of the Empire (Alföldy 1962) and of the legionary veterans among the local population naturally promoted Romanization of both groups, as Latin was the only common language that could be used in any contacts between them.

3. CONCLUSIONS

The field verification and update with the use of modern technologies of the data available form older publications proves the special role of the site Gračine within the cultural landscape of the area during the Roman period. However, the state of research was based mostly on chance finds of surface material, and as such it may be somewhat biased with an overrepresentation of the areas with more intensive modern human activity. Further non-invasive surveys of the region are planned, with the use of additional methods, especially systematic fieldwalking which will help determine the actual density of ancient settlement. Additionally, at least some sites will be surveyed with geophysical methods, hopefully allowing for a more precise establishment of their type, layout and state of preservation. According to the available data, we can state that the site Gračine with the surrounding settlement features indeed appears to be a regional
centre in the hinterland of ancient Narona. Within the valley of river Trebižat it appears to be the nucleus of the whole cultural landscape due to beneficial central location, important infrastructure and special status resulting from the presence of the military and the roles it performed in relation to Narona.

NOTES
[1] Ljubuški Archaeological Project was conducted under the direction of Tomasz Dziurdzik MA and Mirko Rašić MA, with the participation of Ivo Dragićević MA, Pawel Janik MA, Anna Mech MA and Michal Pisz BA. Partial financing for the project was provided to the members of the University of Warsaw student research organisation Studenckie Koło Naukowe Numizmatyki i Archeologii Rzemu UW by Rada Konsultacyjna ds. Studenckiego Ruchu Naukowego UW, project 38/II/2015 entitled Krajobraz osadniczy wokół stanowiska "Gračine" (Ljubuški, Bośnia i Hercegowina) w okresie rzymskim i późnoantycznym - dokumentacja i rozpoznanie meto dami niedestrukcjnymi.

[2] The river is known under several names along its course: Culuša – Ričina – Brina – Suvaja – Matica – Vrlika – Tihaljina – Mlade – Trebižat due to its several disappearances and resurfacings in the karst landscape. It is under the name Trebižat that it flows into Neretva in Struge near Čapljina. For the sake of simplicity, whenever the "river Trebižat" is mentioned in the current study, the whole part of the river within the Ljubuški community is meant, regardless of the fact that particular sections of the river are called Tihaljina, Mlade or Trebižat.


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ABSTRACT
The Istrian peninsula has been inhabited since the Palaeolithic, but only Bronze / Iron Age hilltop settlements have had a significant impact on the landscape. More than 400 sites have been identified, and it is not difficult to establish a relationship between the geomorphology of the land and the anthropized / anthropic landscape. A radical change occurred in the landscape with the roman conquest and Romanization: hilltops were abandoned and new settlements appeared. Urban settlements were organized for the first time, while the countryside was dotted with farms (villa rusticae). The number of sites remained roughly the same, but their distribution is quite different. The Roman Age villas were positioned mainly along the western coast and within a few kilometres from it, and almost all on flat land suitable for Mediterranean agriculture. During the transition to the Middle Ages some open sites were gradually abandoned, others were nucleated with the formation of villages, some hilltops were resettled and fortified. These processes had an important impact on the formation of the modern Istrian landscape.

Keywords
Istria, Prehistory, Antiquity, settlements, landscape

1. INTRODUCTION

The Mediterranean setting of Istria, a Karstic region in the Northern Adriatic has deeply influenced the settlement of the territory. The peninsula has been inhabited since the Palaeolithic, but Bronze and Iron Age hilltop settlements have had a great impact on the landscape. More than 400 such sites have been identified, and it is not difficult to recognize a relationship between the geomorphology of the land and the anthropized/anthropic landscape. A complex network of hilltop settlements, based on the natural features of the relief, is clearly identifiable, especially in some areas. Due to natural erosion, many possible conclusions are outside our reach, but the surviving elements are enough to establish an interpretative principle.

A radical change occurred in the landscape with the roman conquest and Romanization: hilltops were abandoned and new settlements appeared. Urban settlements were organized for the first time, while the countryside was dotted with farms (villa rusticae) as the economy changed from prehistoric pastoral subsistence to intensive production for a wider market. The number of sites remained roughly the same (around 450 are known), but their distribution and position is quite different. The Roman Age villas were positioned mainly along the western coast (and within a few kilometres from it), and almost all on flat land suitable for Mediterranean agriculture. The agricultural economy based on exports depended on good traffic connections for transport, and the sea routes were extensively exploited.
During the transition to the Middle Ages, interesting processes occurred: the gradual abandonment of some of the open sites, a nucleation of others with the formation of villages, the resettlement of hilltops as fortified settlements. These trends had an important impact on the formation of the modern Istrian landscape.

2. PREHISTORY

After the older prehistoric periods, in which the first groups of humans lived in natural caves in the limestone geological environment (Palaeolithic) and later in the open (Mesolithic, Neolithic, Eneolithic), with the arrival of new populations at the beginning of the Bronze Age new settlements were built on hilltops (ital. castellieri, croat. gradine). The geomorphology of the land is well suited for this purpose, because Istria has plenty of hilly areas, with rounded prominences 20-40 m above the terrain. This is especially true of the areas around Rovinj and Poreč, but the prehistoric hilltop settlements are fairly evenly distributed in the whole peninsula (Marchesetti 1903; Buršić-Matijašić 2007). Their main feature is that they are easily defended, and that is why they were chosen for permanent settlements in the Bronze Age (2000 – 1000 B.C.) and Iron Age (1000 – 100 B.C.).

The abundance of limestone favoured the choice of the material at hand for building the ramparts, as well as at least the foundations and lower parts of huts. The fortifications survive as heaps of stone, as the prehistoric inhabitants did not use mortar, but the drywall technique. Their remains appear in various sizes and forms, which depend not only of the number of people it was destined to contain, but also of the natural shape of the hill. They had at least three complementary functions: defense, housing and shelter for animals. The layers of rock were normally extracted from the top of the hill to obtain the building material for walls. In the same time, with this procedure the surface within the walls was flattened and rendered more suitable for building houses / huts.

A lot of attention was given to the planning and construction of the entrances into the hill fort. It was very important to defend them effectively in case of need, so they were conceived as corridors dominated from

![Fig.1. The three hillforts of Picugi near Poreč (photo RM).](image-url)
above, from where the defenders could control the passage. Several examples have been excavated. One of the most important istrian hillfort is Monkodonja near Rovinj, excavated 1997-2008 by an international team (Archaeological Museum of Istria, Rovinj Town Musem and Freie Universität Berlin; Hänsel, Mihovilić, Teržan 2015). The analysis of the territory has revealed that the hillforts were not randomly positioned, but one of them, on the most important point, was the centre of a group of settlements that were somehow socially connected (Buršić-Matijašić and Matijašić 2015, 294). The grouping of hillforts reflects the social organization, but the lack of other data makes it impossible to be more specific. Their spatial organization was also planned as a defense system of the surrounding territory. Such an example are the hillforts along the mountain range of Ćićarija (Monti della Vena), which defended not only the passage through the mountains, but a huge territory of northern Istria. It was the only land passage from the north into the peninsula.

Fig. 2. Map of distribution of prehistoric hillforts (from Buršić-Matijašić 2007).
The hillforts that appear to be the centre of a group of similar but smaller settlements are always in a protected position, not visible from far away, never above the open coast. This is the case of Nesactium, Pola, Alvona, Kunci/Castellier near Dusmani, Valaron and Gradina above the Lim Bay. The social character of these hillforts can today be recognized only by indirect elements, such as the position and size of the settlement. Those that occupy an area of more than 2 or 3 ha were certainly permanent settlements, while minor ones could have been used as refuges in case of need, as observations points, shelter or seasonal settlements during the yearly transhumant migrations. Due to various changes, some could even have changed their main function, and not all were inhabited during the whole Bronze and Iron Age. Some could also have increased the usable space by building more concentric defence walls, other could have shrunken to a smaller area within the walls.

3. THE TRANSITION FROM PREHISTORY TO THE ROMAN PERIOD

The Istrian peninsula was conquered by the Romans in 177 B.C., but the Romanization proper started after 50 B.C. (Matijašić 1991; Buršić-Matijašić and Matijašić 2015: 297), when the colonies of Pola and Parentium were founded on the western coast. During those 120 years, the Romans did not intervene heavily in the region. It seems that they only placed some military observation points along the coast, because their main aim was to safeguard the sea route along the coast, by controlling the subdued Histri. Unfortunately, no traces of such settlements have been found, or identified. Only recently a study of those hillforts that present traces of roman age occupation has started to give some new data.

The excavation of one such site, Monte Ricco near Vrsar, started in 2014, and at the moment is seems that it was inhabited in the Bronze Age, and then again during the 2nd – 1st century B.C., but not after that. As the site is in a prominent position, with a view over the sea, but also over part of the interior plain with a lot of prehistoric hilltops, it may not be impossible that the settlement was a roman outpost, although for the moment (the excavation is only at the beginning) no military-related material has been found.

In the light of the fact that massive roman colonization occurred only after 50 B.C., we might expect that the descendants of the Histri subdued in 177 B.C. continued to live on their hilltops, but their access to the sea was limited, they were forbidden to build and use vessels capable of attacking the passing marine traffic, and they could not wear weapons. But they were still there, and living as usual on their prevailing Iron Age economy.

4. THE ROMAN PERIOD

The establishment of the colonies changed everything. The arrival of probably several thousands Roman citizens was preceded by the organization of the territories of the new towns, Pola and Parentium (centuriation, Marchiori 2013). Large portions of the best land along the western coast, and at least about 15 km inland, were requisitioned, the Histrian occupants probably forcibly removed further inland, so that almost all hillforts were abandoned.

The new settlers received a land lot per family unit within the centuriation grid, while the more distant areas, although also divided by the centuriation, were probably for communal use. In those areas some local inhabitants may have been given permission to remain, because a number of epigraphic monuments from within the colonial territories bear autochthonous names and names of pre-Roman divinities (Matijašić 2015: Fig. 4). That was the start of the Romanization of the pre-Roman population in Istria. Those in closer contact with the colonies and their agri were quicker to adapt, while those in the more remote and isolated interior preserved their traditions for a longer time, but by the end of the 2nd century all traces of the indigenous culture disappear from our epigraphical and archaeological sources.
The main integrating factor was the economy. The Romans introduced the villa system (*villa rustica*), in which a farm was the centre of an agricultural self-sufficient estate. The main product of the land in Istria was olive oil (and wine), produced and exported in great quantities, particularly to the Danubian limes in the provinces of *Noricum* and *Pannonia*.

The protection offered by the hillforts was no longer needed, and they were gradually abandoned also in the areas of the peninsula outside the colonial agri. In a few documented instances at our disposal the life of local communities was transferred from the top of the hill to the valley beneath it. It is the case of *Flanona* (Buršić 2011) and *Alvona*, on the eastern coast. It was more practical to live near the sea, or in the valley through which the roads passed. Instead of expanding the settlement further on the hill, a new unfortified settlement gradually grew at the foot of the hill. Romanization led to the displacement of settlements in places less protected, but more comfortable.

The case of *Flanona* (today Plomin) is emblematic as the life there seems to have continued on the hilltop as well as at its foot. Of course, they would have their reasons which we today do not see. The site has yielded many votive inscriptions, almost all to local deities, and it may have had a religious importance for the wider community of Liburnians who inhabited the eastern Istrian coast.

Returning to the centuriated colonial agri, the number of known sites of Roman villas is similar to that of the prehistoric hilltop settlements (around 450; Buršić-Matijašić 2007: 582; Bulić 2014: 319-369), but their distribution is different, particularly in the coastal area, as the produce of the land were exported by sea. The density is greatest within a narrow strip along the coast. All villas had to have an exit to the market,
and if they were inland, they relied on roads that led to the sea. Almost every bay has traces of traffic in the roman period. Some of them, where a few roads or tracks from the interior converged, were organized as small ports with breakwaters and piers, and it was there that the inhabitants of the interior came in contact with the outside world. The colonies were medium-sized hubs that collected the goods from the land and relayed them to Aquileia, the main port of the Northern Adriatic, from where the main state roads to Noricum and Pannonia started.

The roman villas were a powerful means of Romanization, because they represented the new way of life that became the model for the subdued population to emulate. The luxury in some coastal villas (villa maritimae) was proverbial. The Romans chose the best spots along the coast for their buildings with parks and gardens, some of them even had vivaria, basins in the sea for keeping live fish.

The case of Brijuni (Brioni) Islands is again emblematic, because the archipelago was property of a very highly placed senatorial family, probably the Laecanii, and later passed to the imperial fiscus, thus becoming property of the crown. The Laecanii had an important pottery manufacture in Fažana, on the mainland opposite Brijuni, which produced large quantities of amphorae, containers for transporting oil and wine (Bezeczky 1998: 3-6; Bulić and Koncani Uhač 2010). Another senatorial family, the Sissenna, had a similar, if not bigger, factory in Loron near Poreč (Carre et al. 2011), which later in the 1st century AD became property of an influential women entrepreneur, Calvia Crispinilla, and both workshops became imperial property before the end of the 1st century AD.

5. THE TRANSITION FROM THE ROMAN PERIOD TO THE EARLY MIDDLE AGES

The economic boom of the Istrian agriculture lasted for a little more than a century. Already in the 2nd century the quantity of olive oil produced along the western coast diminished sensibly, and the producers could not meet the demands of the Danubian market. It is as yet unresolved whether it was the impact of a cheaper Hispanic oil or a natural catastrophe (such as drought or cold, both of which can fatally damage the olive trees) that brought an end to the Istrian export-oriented economy. The villas, some of which previously had sets of three, four, six and even ten oil presses within the same building, were gradually transformed: some retained only one or two presses, others changed the production completely.

In Late Antiquity, i.e. after the 4th century AD, the oil was clearly produced for local use only, as was wine and other agricultural produce, that, unlike oil, were never exported in great quantities. This did not result in dramatic changes in the economic and natural landscape. Some land was clearly abandoned, but the villa system persisted in the following centuries, although in different circumstances.

A villa excavated recently at Dragonera near Peroj shows clearly two phases (Starac 2010): built in the second half of the 1st century AD as a luxurious villa with mosaics in the residential quarter facing the sea, but also with an agricultural section, it was destroyed by fire in the 4th century and reconstructed in the 5th century, again with new mosaics and again with an oil press and a smithy (but also all other ancillary facilities, such as kitchen, magazines etc). The building was remodelled slightly during the 6th century, and again at the turn of the next century. It was obviously modified for housing an increasing number of people, until it was burned down again in the 7th century (the exact date could not have been established). After that, all inhabitants left the site, and there are no traces of life after that.

A comparable example from another coastal site, Vrsar, shows a similar situation of a luxurious villa abandoned after the 6th – 7th century AD, which has been established by the first explorer (Mirabella Roberti 1944) who found a hearth on the Late Roman mosaic floor in what appears to have been one of the representative rooms of the villa, here also facing the sea (Tassaux 2003). This degradation of a luxurious space is a clear sign of radical changes between the 6th, 7th and 8th century. While the refugees from Pannonia in the previous centuries brought the same “roman” way of life, but on a lower economic level, new immigrants after that represented a radical change, but were soon acculturated.
Historical sources mention the first Slavic incursions into Istria at the very end of the 6th century, while a slow immigration of small groups started probably soon after in the 7th century. The Slavs settled in the interior, in areas that were abandoned by the Roman inhabitants. The latter retreated into new fortifications that were hastily organized on hilltops once again. Buzet (Picientum), Roč (Rotium), Labin (Alvona) and Plomin (Flanona) were probably the earliest examples. Those living in villas and villages near the coast retreated to Pola and Parentium, but also to the new fortified towns of Ruginium (Rovinj), Ursaria (Vrsar), Civitas Nova (Novigrad) and Humagum (Umag). It is significant that some prehistoric hilltop sites were inhabited again in this period, and almost all medieval – modern settlements on a prominent hill in Istria have prehistoric roots, most of them with a hiatus during the roman period.

The transformation processes were not evenly distributed through the peninsula: the descendants of roman citizens continued to live in towns and along the western coast, while the Slavs settled in the interior on the lands abandoned by their previous owners who migrated to the towns or nucleated settlements. The territory of Pola in the southern part of the peninsula was less affected by these processes, and here the villas were transformed into villages, whose inhabitants continued to cultivate the surrounding land. Very interesting is the case of the so-called “Castrum” on the island of Brijuni (Begović and Schrunk 2007: 95-112). In fact, it is not a military fort, as the name would imply, but a civilian settlement that developed spontaneously on the western coast of the island, looking away from the mainland, on the remains of a classical villa. In the 5th – 6th century it became a fortified agglomeration populated by refugees from the Danubian provinces, but was abandoned shortly after the 7th century.

Another element that must be taken into account at this point is the Christianization of the population, which by the 6th century was almost complete. Parishes became a form of territorial organization parallel to the secular authorities, so churches and chapels sprang up in every agglomeration, even the smallest. The archaeological remains of early medieval churches and chapels generally are a diagnostic sign of a settlement site, but they are also most often situated on the remains of a classical roman villa rustica. So there are many instances of continuity, even in the case of villages which were abandoned in the Middle Ages after the pest epidemics. Some churches remain and are even today rather well preserved.
Archaeological research in the Guran microregion, near Vodnjan, has lead, among other things, to the discovery and exploration of an Early Medieval church of St. Cecilia (8th century) which was built on a 1st century AD roman villa (Jurković et al. 2011). The research is still under way, but the continuity of life on the site during all these centuries must be taken as an established fact. The villa was extensively remodelled in Late Antiquity, which is logical in view of the economic and demographic changes in Istria in those centuries. It was not a luxurious villa, as all such signs are absent, but it was one of the many production units, of which we know many examples. In some cases, such as this, the villa was transformed in an early medieval village, of which today only the chapel remains.

6. CONCLUSIONS

During the long period from the end of prehistory to the beginning of the Middle Ages (2nd century B.C. – 8th century AD), the anthropic landscape of Istria was transformed several times. Although the data at our disposal could be defined as incomplete and non-conclusive, the main trends can be defined in a few general statements and/or hypotheses that should be verified and revised in future research:
- the prehistoric hillforts were not abandoned immediately after the Roman conquest, but the process

Fig.5. Map of the Guran area (from Jurković et al. 2011).
started after the foundation of the roman colonies;
- in the roman period, life from the hilltops descended into the valleys and to the coast, nearer to the lines of communication;
- during the Roman period, at least for some time, some hillforts were continued to be occupied, it is not yet clear whether by Romans or the descendants of the Histri;
- the period of greatest economic prosperity was between the 1st and 3rd century, and is characterized by the villas and their export economy;
- between the 4th and 6th century the villa system has been maintained, at least along the western coast;
- during Late Antiquity, some villas, particularly in the interior, have been heavily downgraded in architectural quality and productive quantity;
- some villas on the coast have started grow into semi-urban and urban settlements;
- almost all villas in the interior have been abandoned after the 7th century, but some were transformed into villages, already Christianized;
- some churches and chapels that survived during the Middle Ages are even today signs of the existence of early medieval villages that sprang up on villa sites. (1)

NOTES
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BIBLIOGRAPHY
CLOTHING THE IRISH LANDSCAPE. A CASE STUDY OF TENANT TREE PLANTING IN CO. MAYO 1765 TO 1910

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ABSTRACT
This paper centres on the legacy imparted upon the land by tenants engaged in state sponsored tree planting in the modern period. The study seeks to ascertain the relationship of the tenant agrarian landholder to the planting of trees, through a state-incentivised tree planting scheme in the eighteenth and nineteenth centuries. For the tenant population the state initially espoused a coercive approach to induce tree planting from 1698. A more benevolent tree planting scheme evolved and was implemented in 1765. This created a registry of trees for tenants, which is the principal source reviewed here. This register contains a wealth of material on the tenant population, tree species, number of trees planted, location and the landlord involved. Drawing on work by the woodland historian Eileen McCracken and geographers Smyth and Tomlinson, the research seeks to extend the focus of their research to elucidate the cultural significance of this documentary evidence.

This paper examines how landscape reconstruction from documentary evidence can enrich our understanding of the rural Irish Landscape but also the intersection of state and local actors who shaped it.

Keywords
Irish woodland history, tenant tree planting in Ireland, cultural landscape history, historical geographies of landscape

1. INTRODUCTION

Woodland in Ireland, which suffered greatly due to war in the seventeenth century, became an issue of sustainability in the aftermath of the Battle of the Boyne (1690). Timber resources in Ireland, as far as the then government was concerned had been ‘utterly destroyed’ with insufficient material ‘for the repairing of the houses destroyed, much less a prospect of building and improving’ (Ireland, 10 William III c.12 1698). The Williamite government set about to remedy this in 1698 by the introduction of compulsory tree planting by landowners and landholders of a certain size. Specific species and quotas of trees per county were stipulated for the envisaged new tree plantations, with penalties for non-planting.

Ten years later after some alterations of the legislation it was conceded that the planting had ‘not been duly observed or at least have not answered the good intent of the act’ (Ireland, 9 Anne c5 1710). It would appear that the central state had little control over the lack of improvement in tree cover as a result of the legislation which ‘proved ineffecutual’ with many not having ‘complied with the directions’ of the law.

There were repeated reconsiderations of the mechanisms for introducing planting by decree. By the second decade of the century the deficiency in progress was abundantly clear. Repeal of the punitive pre-1721 laws brought about a dismissal of penalties for non-planting and the introduction of an inducement for tenants to plant. Despite the change in approach at state level to garner support for the planting scheme by a removal of punitive methods, it was not until 1765 that a more complete inducement to plant was enacted.
The ‘want of timber’ in the country persisted in the latter half of the eighteenth century was ‘most obvious’ to the Irish Parliament (Ireland,5 George III, c.1765). A more progressive timber act of 1765 allowed for a certain class of landholder, those who were tenants for life, to have an interest in trees planted as a result of the legislation. This was provided the tenant complied with the administrative regulations by registering the trees. A ledger for each county called the Registry of Trees was compiled by the Clerk of the Peace for the county containing the registrations made by tenants.

The documentary evidence from the tree registries is examined in this paper. The general pattern of planting was very low initially but increased rapidly post 1800. This trend continued until 1840 after which it declined radically (Fig. 1). This paper seeks to examine how the intersection of the agency of state, tenant and landowner shaped the modern landscape through tree planting during these periods. The key objectives are: to understand why each stakeholder facilitated or implemented the planting of trees; Who were these actors and what was their relationship to each other? Lastly how did these actors shape the landscape which we now understand as our cultural heritage? This paper aims to analyze these landscape transformations by examining in detail the Registry of Trees for Co. Mayo, a western Irish county on the Atlantic periphery.

1.1. Methodology: Historical geographies of Landscape

From an overview of the Registries of Trees from 1765 to 1900, three distinct phases in tenant planting can be identified (Fig. 1). The first phase was a low impact period in the late seventeenth century registrations. The second phase, a rapid increase post 1800, reached a peak by 1840. The third phase was a phase of decline, to the turn of the twentieth century. Reasons for a flux in planting were due to a number of social and political factors which will be explored within this paper. To explore the impact of each of these phases in tenant planting, the Registry of Trees for Co. Mayo will be examined.

This paper draws on three theoretical/methodological approaches in cultural landscape studies: [1] the traditional morphology of landscape (Sauer 925) and landscape history (Hoskins 1955); [2] class and power structures within the landscape (Mitchell 2003; Matless 2005) and [3] the symbolic meaning imprinted on the landscape (Cosgrove and Daniels 1988).

The first technique of morphology and landscape history is rooted in the Sauerian school of cultural geography (Sauer 1925) and local landscape history associated with W.G. Hoskins (1955). The former morphological approach reconstructs and maps change in the physical form of the landscape. The latter approach investigates the narrative of landscape. By mapping the tree registrations, physical changes in the landscape over time can be demonstrated. The chronological narrative of the tenant planted landscape can be ‘read’ through landscape history.

The second methodology examines class and power as an integral part of the changes in the Irish landscape during the eighteenth and nineteenth century. The ‘polyvisual’ meaning of landscape can be understood from an examination of the how the landscape was formed through a particular economic structure (Richards and Robertson 2003: 6 and Mitchell 2003: 4). This examines how economic processes shaped the landscape through the manipulation of labour. Within the Irish example, the Irish landlord and substantial tenant required a ready supply of labour to plant the vast amounts of trees needed to change the landscape. The resultant landscape was in part due to how these actors exercised power over labour supply during each planting phase. The materiality of landscape can explain how economic factors influenced the morphology of landscape. However, to better understand why the individual actors felt a compulsion to change the landscape can be better explained through a Foucauldian lens. During the time frame examined the social structure of landlord estate, tenant farmer and peasantry was managed by a liberal central government (Hennessey, 2013:153). Here, the state sought to ‘improve’ both the behaviour of certain parts of society, but also the physical landscape, thorough a particular mode of governmentality ‘all performed in relation to particular techniques and technologies of the self’ (Merriman 2005: 238 as
cited in Wylie 2007: 115). Within the concept of governmentality, landscape can be understood as ‘a vehicle of social and self identity, as a site for the claiming of cultural authority, as a generator of profit, as a space for different kinds of living’ (Matless 1998: 12). Therefore, by a multifaceted approach to evaluating the landscape, we can see how central state, regional power stakeholders (landlords), local administration and the individual local tenants each exerted an influence in a variety of ways upon the landscape through time.

A third method drawn upon is the study of the ‘visual ideology’ layered in the landscape (Cosgrove and Daniels, 1988). In Ireland during the time under review there is an obvious ‘grammar’ which can be applied to the landscape (Finch and Giles 2007: 8). Here, the landscape is inextricably linked with the ‘big house’, the large estate house and the wealthy Georgian farmer. The symbolic references inscribed by this social structure are examined through a representational lens (Cosgrove and Daniels 1988).

By combining of these landscape techniques, the historical geography of landscape presented in this paper seeks to explore what Seymour (2000: 214) refers to as ‘the materiality of physical changes on the ground, and the substantive, power laden and transformative nature of representation’ of this tree planting initiative.

2. THE REGISTRY OF TREES CO. MAYO 1765 TO 1910

2.1. The ‘Big House’, emparkment and the large tenant improver: 1765 to 1800

A new found political stability of the eighteenth century heralded the epoch of a bold new intervention into the Irish landscape: the Georgian mansion. From 1710 to 1730 and in a second wave in 1760 to 1790 there was a rapid rise in the construction nationally of what was termed the ‘Big House’. Fuelled by rising rents and a buoyant export market these private estates embellished their grounds with Brownian references to confidently create designed landscapes (Whelan 2011: 77). Implicit in a successful landscape was the provision of trees, deemed lacking in an Irish context. Arthur Young chronicles this sentiment in the 1770s where he describes a setting near Londonderry as ‘the most picturesque of any place I have seen… the
scene wants nothing but wood to make it a perfect landscape’. The ‘Big House’ framed by plantations and decisive emparkment rose out of the landscape to set the improver apart from the ‘naked and most unpleasant appearance’ of its hinterland (Williams 2008: 129).

Williams (2008: 131) notes that a contemporary British tourist was dismayed at the lack of tree cover in Ireland. Its dearth evoked an anxiety of trees as representations of nationhood and strength. The economic means for this improvement was capitalised by a tenant population stratified in a hierarchical pyramid of large tenant farmer, small farmer, cottier and landless labourer. It was through the tenant farmers that the state intended to make good this ‘want’ of trees by the introduction of a legislative framework in 1765 to engage the tenant landholder in planting. The targeted landholder, the large farmer and substantial tenant possessed capital and innovative methods required to improve the landscape. Here, these favoured tenants could draw upon a cheap and abundant supply of labour from subsistence cottier and agricultural labourer settlements on the fringes of the nucleated farmsteads (Whelan 2011: 83).

Implementation of the tenant tree planting legislation from 1765 allowed for the aspirations of the state to be carried out in a self-regulatory manner. With little or no direct intervention in planting the state had by 1765 developed a proxy forestation programme. This self-governance of the landscape was carefully engineered by the central state through its legislative constructs. Only tenants for life were permitted to avail of their interest in trees planted and only if they registered the trees with local government authorities in the form of the Justices of the Peace at the county quarter sessions. From the outset this excluded the majority of tenant holders. Only socially mobile and already financially independent tenants were permitted by the state to participate in planting.

On a national basis the state-initiated planting had four distinct phases. These were broadly marked by a slow uptake in planting pre 1800, its zenith in the first two decades of the nineteenth century followed by a slow decline post 1830 to 1900 leading to its disuse in the first two decades of the twentieth. A second wave of planting in the latter half of the 1900s, as experienced by counties such as Mayo, Kilkenny and Derry, was less typical.

As was the case nationally there was a slow and only very modest response by tenants in Mayo from 1765 to 1800. These were confined to a belt of planting to the south east and extended toward the town of Westport. Its distribution was of isolated pockets with a low planting levels comprising of hawthorn, ash oak, elm and a small amount of willow. The scale of planting and the diversity was not ambitious and its aesthetic impact was minimal in an already treeless landscape. Tenants that planted were from well-established families, often minor branches of the main land owning families. Names present in the registrations such as Cuff, Crean, Daly, Gildea, Lynch, O’Malley, Taaffe, Heenen and Rutledge, of middle rank gentry were to continue to uphold their social position into the following century.

An example at Creagh in the parish of Ballinrobe illustrates how a tenant James Cuff, a relation of the landlord Baron Tyrawley created a new wooded landscape. The ages of the trees planted ranged from seven to eighteen and their height from five to fifteen feet. The older and larger specimens of trees would have been sourced and transplanted from a nursery, thus requiring additional labour. The tenant can be seen here to at least have the motivation of an improver, if not the grand scale means to do so at this stage.

The under scaffold of a cheap and available labour supply has not yet become ubiquitous which may have hindered the tenants capacity to ‘landscape’ during this phase. Additionally the ‘Big House’ building, the linchpin of the framework in which the state devised programme of planting operated, did not reach its height in Ireland until the mid-1770s (Whelan 2011: 75). Thus although we see an embryonic designed landscape we cannot see the ‘active intention’ of scale or mass which the central state had anticipated (Kearns 1992: 408). With neither the landed estate nor the marginalised ever-ready supply of labour firmly established the fundamental trickle-down, or as Whelan (2011: 75) describes the ‘mimetic response’ of middle strata in society could not be realised at this point.
2.2 Clothing the landscape: 1800 to 1840

The first three decades of the nineteenth century saw a sharp increase in the level of planting, a trend which is illustrated across all counties (Fig. 1). In the case of County Mayo the pattern of registrations expanded from the isolated registrations of the previous phase. Its geographical distribution had radiated from the core south eastern region to include the north east of the county toward Killala and the density of planting toward the western urban centre of Westport increased (Fig. 2). The northwest and southwest remain bereft of tenant registrations. The volume of planting also increased dramatically along with the diversity of species (Figs 2 and 3).

![Spatial distribution of total planted trees: phase 1 1785-1800](Image)
![Spatial distribution of total planted trees: phase 2 1801-1840](Image)
![Spatial distribution of total trees planted: phase 3 1841-1900](Image)
![Phased tenant planting diffusion 1765-1900](Image)

Fig.2. Distribution and diffusion of tenant trees planted Co. Mayo, Byrne R. 2015.
These privileged tenants now had the means to plant more expansively with a greater variety of trees. Coniferous species of Scots pine, larch and Norway spruce were the most popular. Non-native species of sycamore and beech were also planted expansively. Ash and hawthorn remained important mainly for enclosure and alder proved useful in planting in more marginal areas. These tenants were now planting not just functional enclosure hedgerows but also parkland trees and avenues. This stage saw a dramatic change in the aesthetic appearance of the larger tenant holding through. A spider web of lesser estates exploded upon the landscape. The demesne “islands” were now connected in a necklace effect by these tenant estates.

Smyth notes that there are distinct categories of tenant planter, the working farmer, the landlord (who leased from other larger landlords), the emerging proto-industrialist, the middle class priest, professionals such as doctors and solicitors and lastly the ‘parasitic middlemen’. It is the former which Smyth (1997: 66) finds to be the largest group of planters. On a regional basis this varied but in Mayo, for example the majority of planting is by the middle gentry who established or enhanced minor demesnes. These tenants

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were often from the middlemen group who acted as agents, Justices of the Peace and some were even appointed as high sheriffs. In the case example at Creagh, parish of Ballinrobe the effect of this marked change in the landscape as a result of the planting by the tenant James Cuff (Fig. 4) is clear. Cuff did not plant a ‘working’ landscape but rather created a designed landscape which aped the ‘Big House’. How this tenant could achieve this was by a readily available labour force drawn from the rural peasantry.

In Ireland the population, which had steadily increased from 1760 to well after the first decade of the nineteenth, was facilitated by monoculture of the potato crop. In turn this sustained an independent labourer who through unfavourable land tenure remained in a state of poverty (Whelan 2011: 96). Crucially for the tenant planter and their landlords, this suppression of living standards, coupled with high rural population density, ensured a surplus supply of labour. At Creagh we can see the use of this surplus labour. To the northwest of the estate a settlement held in rundale along with a cottier settlement to the eastern periphery provided a supply of labour (Primary Valuation of Tenements, Ballinrobe Union, 1858: 36).

These rural Irish ‘slum’ settlements also induced the better off tenant to screen and close out any of this impoverishment. This is exactly what occurred at Creagh where dense plantations were planted to the boundary of the tenant estate (Fig. 4). The sentiment of manipulation of the cottier and peasant farmer was strikingly evident during this period. An account by Edward Wakefield in 1812 elaborates upon this where; the peasant farmer who took land ‘for potatoes during next two or three years at six or eight guineas an acre per annum, according to the quality and by an agreement of this sort, the proprietor would receive back his land ready [for planting] and perhaps manured’ (Wakefield 1812: 594).

![Fig.4. Local level reconstruction at Creagh and Cuslough, top left Cumulative effects of registrations 1765-1841, top right pre 1800 registrations at Creagh, bottom right post 1800 registrations at Creagh and Cuslough.](image-url)
The landscape which was created at this time as a result of the registry of trees was aligned with the ideals of an ‘improved’ landscape. Very little in Mayo however could be described as functional. Of the 150 registrations during this time only thirty five were on farms, two were for mills and one was in an urban context. The remaining 132 were for amenity planting around minor demesnes. The diffusion of planting from this period also bears a remarkable similarity to that of large farmsteads apparent ten years later from the Primary Valuation of Ireland and of the regional core estates (Jones 2010: 301, 312 and Fig. 2). This middle gentry or wealthy tenant, held leases from a small select group of landowners. This middle strata then held influence over the larger farming interests in the region. To this end there is an indication then of the success of one ambition of the central state; to create a particular landscape improvised by a specific faction of society to influence and control a lower tier.

Wakefield (1812: 535) summarises the success of the state supported planting scheme during this time where:

"Many are the gentlemen’s seats which have been ornamented with wood upon tenant interest in various parts of Ireland and without this act, neither the house would have been built nor the trees planted and as wealth becomes diffused and is distributed into many hands, it will ensure plantation around houses of middle rank which would have remained as they were"

From the diffusion, diversity and quantity of planting form 1800 to 1840 it is evident that tenant planting had an impact upon the ‘barrenness’ of the land (Figs 2 and 3). Whilst this may be regarded as a symbolic representation in the landscape it was an important development. Its absence was in effect an affront on British sensibilities which regarded Ireland as a ‘very valuable portion of the British Empire’. Lack of progress in tree cover only served to highlight Ireland as a periphery of Britain not fully engaged in the cause of empire where ‘serious attention of those who may be anxious for the improvement...towards its amelioration’ was necessary (Wakefield 1812: 356). Although some progress is evident, tenant planting to this point was not fully successful in bringing the country out of its state of Irish baldness. Ireland remained as a partially evolved landscape with a requirement for further work to shape it into a British state.

McCracken (1984: 7) hypothesises that the decline in tenant planting nationally from the 1840s onwards was due to the fact that planting was now replete and therefore had reached a natural end. We can however see a contrary opinion in the letters by the sociologist and novelist Harriet Martineau, who in 1852 wrote of the situation of the Irish and woodland where: ‘men don’t care about wood, that they are so accustomed to see Ireland bare, that they would not know their country if they saw it wooded’. She is at pains as to answer how this can be remedied and the necessity to do so as ‘the recovery from barrenness is so hard’ (Martineau 1852: 55).

It was the very structure of the state designed legislation to deploy tenants to plant trees which Martineau regarded as obstructive to the furtherance of the cause. The failure lay in how the securest of tenants were to maintain their interest in their trees on the renewal of their leases. Martineau cites an example of the absurd consequences of how the law undermined the state’s intentions. Here a tenant who was to renew his lease all of which was in agreement save for trees which the tenant had planted in accordance with the law. To keep his interest in the trees he either had to fell them, cede the title of them to the landlord or the landlord could compensate the tenant for these. Not wishing to be obligated to take the trees off the tenants hand when the latter wished for the trees to remain standing and the property of the tenant, the situation reached an impasse.

Faced with a bind the tenant reluctantly felled the trees, returning the landscape to its previous condition. The same predicament existed for smaller tenants with fourteen years left unexpired on their lease who also had a right to dispose of the trees planted under the revised 1784 legislation. The only resolution to this ‘if the island is to ever be re-clothed’ according to Martineau was to amend the law to extend the property of the trees to the tenant beyond the lease. To not do so would render the situation ‘ludicrous if it were not too sad for a joke’ (Martineau 1852: 54-6).
2.3 Middlemen, clearances and the dissident rural poor: 1840 to 1900

During the 1820s to and 1830s there was an increased demand for land from the rapidly growing smallholder and landless population (Reilly 2014: 57). Many of these were pushed into extremely marginal upland locations where ‘the plains, hills and the valleys are for the most part inhabited by cattle, the bogs and mountains by men’ (Trenor 1822: 3 cited Whelan 2012: 460). This was an environmentally fragile use of the soil on which vast proportions of the rural dwellers depended. These two decades that preceded the Famine also saw the influence of the middleman escalate. Here these local level actors who held long term leases, divided land holdings and sub-let to these vulnerable micro farmers for the extraction of maximum rental returns (Whelan 2012: 64). On the eve of the Famine this had reached dangerous proportions and led to a complete lack of governance of estates. This dysfunction of the management of estates by the 1840s was reinforced by the disincentive of the middleman to improve their landholding as many existing long let leases had either expired or were about to (Reilly 2014: 64-5). It was these middlemen who were the very portion of society whom the state had delegated to replant the country.

To gain some control over their employers estates where this voluminous sub-let culture of landholding, agents used another state infrastructure to clear estates of its pauper population (Reilly 2014: 72). This piece of state architecture, the Poor Law Act introduced in 1838 paved the way for wholesale clearance in the post Famine era. Its effect caused a disproportionate imposition upon a peasant population ‘carried out by the gentry backed by a coercive power of the state’ undertaken under the guise of ‘improvement’ (Whelan 2012: 468). Coupled with this mismanagement, rental returns collapsed, leading to the establishment of the Encumbered Estates Court in 1849. Insolvent estates following the ordeal of the Famine were sold through the court which ushered in a new wave of landowners to the county. One such example can be seen in the local scale example at Cuslough, Ballinrobe (Fig. 4). Here the tenant, a Richard Livesay, advertised the sale of his leasehold of 353 acres in 1866. Livesay had prodigiously planted trees and had registered them during the 1820s and 1830s. Here we can directly attribute local scale intervention in the landscape orchestrated by the state. The system of land tenure however was not resilient enough to outlive turbulent economic and agrarian unrest in the post Famine years. Large leasehold tenants such as Livesay and their landlords became not only an encumbrance to the state economy but were also an embarrassment to the British Parliament. Other tenants, such archbishop of Tuam, Thomas Plunket, who had planted substantial amounts of trees in the same time frame at Tourmakeady, nearby to Livesay’s estate gained from the economic demise of the landlord class. Here Plunket is seen to have benefited in a vulture like capitalist manner from the misfortune of his landlord George Moore (Lane 1994: 59).

The cottier system which depended upon the potato was now recognised as a poor management tool in maintaining an oversupply of labour. Edwards remarks on how this system could be used to assist the large tenant in planting some twenty years earlier was by the 1850s a defunct proposition. The land clearances were most numerous in the Connaught region which badly affected these pauper farmers (Lane 1972: 51). It was little wonder that the ensuing agrarian agitation which had commenced in the 1830s would boil over into a period of prolonged civil unrest.

This was nowhere more acute than in Mayo where the effects of agrarian agitation was to affect Plunkett, the now landlord but previously large tenant holder. In 1860 even though ‘the appearance of the country, it cannot be doubted but that great improvements have been made and a large sum of money expended’, Plunkett left the county for good (Lane 1994: 166). Part of these ‘improvements’ can in part be attributed to the state devised tree scheme but also to the flight of those [the large tenant], who were integral it. An undeniable bias of the tenure system and treatment of the landless through clearances, however forced the underbelly of society toward more violent means. The very core local administrators of the law under review in the form of the Justices of the Peace were not immune to the agrarian unrest. One Justice of the Peace who registered trees in the late 1870s was a Captain Charles Boycott (the term Boycott emanating from his own land disputes during the Land War). Boycott, a large tenant and agent to
Lord Erne, was forced to flee the county and all of his landed interest therein following a series of boycotts by local labourers.

The landscape which had been groomed by the state since 1765 was now collapsing. It was now ever more apparent as a landscape of resistance. Resistance that is to what Laird describes as the ‘subversive law’ of the disenfranchised micro-farmer who had not been fully weeded out by official law and state policy (Laird 2005: 15-42). Gladstone’s initial Land Act of 1870 and its successor of 1881 attempted to placate tenants allowing them to purchase their interest in the land but proved a failure. The momentum for full proprietorship was now in train and a series of land acts would eventually see the end of landlordism by the first decade of the twentieth century.

The pattern of tenant planting in Mayo during this phase bears out this ‘landscape of resistance’, which contrasts with a wider national context. Mayo experienced a second, albeit lesser wave of planting from 1840 to the late 1880s. Why this occurred at this time in this region was as much to do with the disparity in living standards between the middleman tenant and the subordinate cottier tenant. Tenants who planted in this period such as Thomas Palmer and Charles Mahon both former high sheriffs at Summerhill House and Mountpleasent illustrate how the state managed policy was manifest. Both of these properties were established middle gentry seats in a county where a dissenting rural poor would no longer tolerate the obvious unattainability of their own self-determination. Almost as an act of defiance to the social ostracism of the Land League’s boycotts, these tenants continued to uphold the ‘ordinary law’; that is British law. The quantity of planting was reduced to 36% of the previous forty years . However the average planting per tenant during this period was over one and half times greater. This indicates that although the number of this class of tenant resident in the region had diminished, their commitment to the system and the landscape which epitomized this structure remained resolute.

The landscape which they created in Mayo was not as experimental or ornate as in at the peak of tenant planting and was limited to plantation style comprising Norway Spruce, Scots Pine larch and some enclosure using hawthorn (Fig. 3). This trend was similar to the wider context of tenant planters where well off tenants planted substantial plantations rather than the greater number of tenants who planted in smaller blocks, in the previous half century (McCranken,1984:7). By these physical interventions in the landscape these tenants implied that their political and social values were here to stay, despite a wave of boycotts and instability in governability of the county. But luck was to run out for this system and by 1922 ‘pauper-proprietorship’ was almost complete. The ‘Big house’ and its dependant middleman tenant gentry slipped into the shadows and with it its landscape (Whelan 2011: 104). The state now introduced direct intervention in forestry by the establishment in 1903 of a state forestry programme. The previous state mechanism of planting quietly fell into disuse and into obscurity.

3. CONCLUSIONS

State incentivized tenant tree planting in Ireland spanned one hundred and fifty years, during which time over 40 million trees were planted across the country. The motivation to plant at state level and at local level by individual tenants varied across three planting phases. Nationally, during the first wave of planting 1765 to 1800, there were only modest volumes of planting by substantial tenants (Fig. 1). From the Tree Registry of Mayo during this period only 18,000 trees were planted by eighteen tenants over thirty five years. In Mayo, at the close of the eighteenth century the state had achieved little progress in planting by privileged tenants. It is clear at this time that these particular individuals were not fully subscribed to the state policy of self-regulation of the landscape.

The second phase of planting from 1800 to 1840 saw the state induced programme of tenant planting administered with greater effect mainly as a result of the local scale social framework. The landholding structure of a minority landlord proprietorship managed by a wealthy tenant class and underpinned by
a growing peasant population was firmly established in Ireland. In Mayo during the second phase of planting, registrations of trees were clustered around the eastern half of the county and Westport. Here strong tenants with secure leases could now express their social standing in the landscape by planting trees. Registrations increased during this period to 150 and tenants planted over one million trees. During the first four decades of the nineteenth century the state had little direct intervention in tree planting but its policy allowed for a specific type of tenant to regulate and change the morphology of the landscape. Tenants in Mayo who were permitted by the state to plant from 1800 to 1840 implemented a similar style of landscape. They represented a particular class of wealthy tenants within the rural Mayo landscape.

The last phase from 1840 to 1900 saw a decline across the country in registrations as well as the volume of planting. A liberalized system of economics had allowed the proprietors of land and substantial middleman tenants to profit from a rack renting structure. So long as the smallholder and landless population continued to grow this vulnerable system could continue. The Famine put a check on this at which point the state was forced to introduce direct intervention in the management of land. Where an over reliance on rental returns had caused financial distress the state was forced to regulate the landscape. The mechanism for removal of indebted landholders and landlords was through the Encumbered Estates Court. In Mayo this affected the social structure where some tenants were forced to sell their leaseholds through the Encumbered Estates Court. As a consequence tree planting by wealthy tenants reduced.

Simultaneously in this last phase a sweeping disaffection with the social order by the subaltern class exerted its own agency upon the management of the state by the use of boycotts. Agrarian agitation in Mayo during this post Famine era had weakened the elite tenant planter but through resilience managed to maintain a foothold in the landscape. This differs with counties such as Tipperary and Waterford where the large farmer was the principal planter, hence there was less obligation to maintain the façade of a ‘gentleman’s seat’. Here as with most counties the registrations dwindled from 1840 (Fig. 1) as a result of the type of tenant and their response to the changing political climate. For Co. Mayo changes in the morphology of the landscape through planting during the final phase created a landscape of resistance. Here tenants maintained a stance of ‘stiff upper lip’ which ran counter to the ‘subversive’ nature of the class who sought to undermine their way of life. What once represented the hierarchy in social class in the landscape now represented for one party dissent, the other resilience.

At no point during the one and a half centuries of the state enabled planting scheme and despite repeated criticism of the implementation of the law, did the state seek to alter it in response to the fluid social and political context. This suggests that the state continued to maintain its desire to ‘re-clothe’ Ireland to rid it of its ‘barbarous’ nature and to fundamentally retain it as an integral part of Britain, by management of model citizens and their landscape. Although it did succeed in planting it failed to engage the lesser tenant, still a subject of the state (Crampsie 2014: 209). Therefore, its retention as a mechanism in landscape change following the mobilization of that class, could never be realized. Resentment toward this landscape in the closing decades of the nineteenth century also lead to large scale destruction of it through felling in the wake of the final transition to a less class defined society (Whelan 2011: 104). Only fragments of effects of the large tenant planter are now legible in the Mayo landscape. What the Registry of Trees does enable us to understand is how and why it was produced in the way that it was. A tacit collaboration between the individual at local scale and at the larger level of central state reshaped this landscape that has subsequently been remade. Wooded landscapes in the eighteenth and nineteenth century Ireland were more than symbols in the landscape but rather agents of change.
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LANDSCAPE AND HUMAN INTERACTION THROUGHOUT MILLENNIA – A CASE STUDY OF ARCHAEOLOGICAL SITES IN THE NAŠICE REGION, CROATIA

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ABSTRACT

In the Našice region, situated on one of the main routes connecting central Carpathian basin with the northern Balkan region, over 200 archaeological sites from prehistoric and historic times were identified by field survey and archaeological excavations. Supported by the Croatian Science Foundation project “Strategic use of landscape” (IP-11-2013-3700) analysis of site locations for different periods was made. Information thus obtained was combined with information about natural resources (such as water springs, woods, arable land, pedological and geological base etc.) in the observed region and, when possible, with wider regional cultural impact. This provided insight into the role of landscape in the settlement strategies, use of natural resources and communication routes and their change over time. The results show change of position of strategic points over time but they also show that the pattern of their distribution in certain periods was a constant. The information collected by this project can be used in modern time strategies of settlement, agriculture, industry, water management etc.

Keywords
Northern Croatia, Našice region, archaeology, landscape, settlement patterns, communication routes

1. INTRODUCTION

In 2014 Institute of Archaeology (Zagreb) started a project “Strategic use of landscape” founded by Croatian Science Foundation (IP-11-2013-3700).(1) The goal of this project is the recognition of strategic points of settlement in prehistory and later periods and reconstruction of ways of communication in Našice region situated between Požega valley and Drava river (Fig.1). Special interests of this project are two ways of communication in north-south direction from the southern part of central Carpathian basin to its southern outskirts. The first way of communication observed is from the Hungarian part of Drava region to Požega valley. The second way of communication observed is to Sava region through Đakovo plain. The project concerns itself with the area of municipalities Našice, Podgorač, Drenje and Koška. This area is recognized as a potential crossroad of ways of communication of our interest.

The first year of project already yielded substantial results that will be shortly presented in this paper. Although over 200 sites from all periods are documented in this region, we processed around 120 of them so far. Nevertheless, the results show great potential.

1.1. Methodology

Systematic field surveys, conducted since 2007 in cooperation with Našice Local History Museum, showed great potential in discovering new archaeological sites from all periods (Marković, Jurković and Podunavac...
This was used as a base for the project currently under way as a main source of information about Našice region together with the large museum collection and documentation. In 2014 the first project survey was made (Marković et al. 2015: 98-103) in Koška municipality, area never surveyed before. The second survey took place in Spring of 2015. So far, around 20 new sites were discovered, mostly from the Middle Ages.

It is presumed that strategic points changed their position over time but that the pattern of their distribution in certain periods was a constant. Data collected by field surveys and from museum documentation is used for making a model of ways of communication and strategic use of landscape. Spatial distribution of sites on naturally formed communication routes will help in better understanding of communication routes where similar distribution of sites appears but no apparent naturally formed passages are visible. Applying spatial distribution of sites from various time segments will show the areas of larger importance throughout the history. The project includes the study of use of landscape in modern times as well as data concerning natural resources such as water, woods, arable land, pedological and geological base, satellite images etc.

However, data available for each site is not uniform and many sites are known only from old field surveys. Thus, for some sites it is even hard to determine their precise time sequence; for example, there are 20 sites that could be only determined as prehistoric but it was impossible to determine if they belong to the Neolithic, Eneolithic or Bronze Age periods (Fig. 2). Although the data is not sufficient for precise determination of these sites, their position is consistent with site positions of known time determination.

After analysis, for each relevant time period (early Neolithic, late Neolithic, Eneolithic, Bronze Age, Iron Age, Roman period, early and late Middle Ages, Ottoman period and Modern period) maps were created (Fig.2 and 3). Then, spatial analysis was made and main communication routes could be distinguished. Site positions from historic periods were compared with archive data and historic maps (Fig.4). At the end, all the main communication routes were marked (Fig.5).

The process of data collection and analysis is still under way and it is quite possible that the large number of sites will remain undiscovered. It is, however, a great opportunity to process data collected over several decades by the Našice Local History Museum presenting the results to the public, scientific as well as local communities.
Site distribution maps (Fig.2 and 3) combined with other sources of information, such as information about geological, pedological, hydrological etc. conditions (Jamičić 2001; Kovač 2001), prehistoric cultures (Marković 2002; Marković 2010; Marković 2011; Marković 2012; Podunavac 2012) including recent archaeological excavations (Marković and Botić 2014) or historical sources (Bösendorfer 1994; Gračanin 2010; Jančula 1996; Sršan 2000; Sršan 2001) with conservation work published (Valenčić and Papić 1992), give new understanding of landscape, how it was used over time.

Early Neolithic period preferred lower hills near streams or rivers while late Neolithic sites looked for somewhat higher ground but also near the larger water. Considering the fact that Papuk and Krndija mountains were possible sources of stone used for lithic production in Neolithic cultures and the fact that the plain between Našice, Koška and all the way to Donji Miholjac on Drava was probably marshy (Kovač 2001), it is not surprising that the Neolithic settlements have southeast-northwest distribution with very few sites outside this obvious communication way. Sites situated in Londža valley or the one situated in Seona
The late Neolithic site near Koška is placed on a small elevation in otherwise very low terrain but that position may have been chosen because of wood supply and acorn. Sessile oak (*Quercus petraea*) grew on the higher mountain range while the vast plain was populated by penduculate oak (*Quercus robur*) (Kovač 2001) which acorns were used in historic times for animal feed and it is possible that the same method was used in prehistoric times. During the end of Neolithic and in Eneolithic climate changed sufficiently to allow population of lower ground (Fig.2). The same occurred in Osijek region (Marković 2009; Minichreiter and Marković 2011a; Minichreiter and Marković 2013). The number of sites increased in other regions at this period and it is possible that the population increase was the reason for that. During the Bronze Age the site distribution is somewhat vague but there was a great difference in cultural appearance and distribution between Early, Middle and Late Bronze Age (Marković 2002: 15-18). As was stated above, many prehistoric sites couldn’t have been specifically dated which makes spatial analysis for this prehistoric period more difficult. The same can be said for the Iron Age sites although it is possible to determine that two new communication routes appeared during the Bronze Age.
Fig. 4. Habsburg Military Survey maps showing region in question in three periods (1763-1787, 1806-1869 and 1869-1887). Mapire, Historical maps of the Habsburg Empire.
and Iron Ages – one connecting Podgorač (east of Našice) with Koška to the northeast and the other through Feričanci and Bokšić further northwest. This second rout is a natural communication with Donji Miholjac situated some 30 km to the north on Drava river where a natural river passage was in use through all prehistoric and historic times. Roman period sites further confirm these two new communications adding a third connecting Našice and Koška via Jelisavac and Breznica Našička. Historians debate about a Roman road built somewhere in the Našice area connecting Gradac Našički with Koška via Jelisavac and Breznica Našička (Gračanin 2010) but the field survey in Autumn 2014 revealed traces of gravel, possibly from road substructure, south of Koška indicating the possible way via Podgorač (Marković and Botić 2014). As near and in the Podgorač village traces of Roman architecture were found, it is possible that the road in question passed here but more information is needed to confirm that. During Roman time the landscape could have been changed by man in order to produce more arable land, the fact corroborated by the site positions – half of the known sites are in the lower regions (Fig.3).

Then a new era started. Following after the turmoil of Migration period, the early Middle Ages sites, by their distribution and number, show great change. It seems the population was reduced and kept by the main road. In 13th century situation was better and new buildings, such as churches (St. Peter and Paul church in Koška and Templar church in Martin) (Marković 2002: 23; Valenčić and Papić 1992) and fortifications, such as Orahovica, Bedemgrad, Podgorač, Subotički Lug, are built (Marković 2002: 23). Late Middle Ages show great expansion – half of the analysed sites belong to that period. There is evidence of great pottery production in Našice. The lower ground must have been cleared for agriculture and all the communication routes observed in previous times were in use now. That great expansion was cut by the war with Ottoman Empire in the 16th century. After the battle of Mohach in 1526 the Našice region fell to Ottoman hands (Sršan 2001). For almost 160 years Ottomans governed here during which time Našice had 21 Christian houses and 7 Muslim houses with a large military post while Podgorač had 19 Christian houses and 54 Muslim houses with smaller military post. Koška at the same time had 25 houses (Sršan 2001). The map here (Fig.3) doesn’t show the real situation at that time but this is the state of current research. The population must have fled or was killed in the war although new population from the south came with Ottoman army and settled some areas. The devastation of this region happened at the end of the 17th century when Ottomans were forced to leave this region. The devastation was so brutal that the list of settlements composed in 1688 shows only 70 settlements out of 452 in regions around Osijek,
Požega and Virovitica (Sršan 2000: 10) while in 1696 only 8 settled and 313 deserted ones were recorded in Osijek region and 131 settled and 181 deserted in Požega region (Sršan 2000:10). It is estimated that only 20% of population remained in Slavonia (about 40000 people) after the Vienna war in 1683 while the population was doubled by 1698 (Sršan 2000:10). How difficult the period after the Ottoman wars was can be observed on historical maps (Fig.4). The First Military Survey (1763-1787) map shows area between Našice and Koška almost completely forested. Many of the settlements known from historical records disappeared and most of the surviving settlements are on a higher ground. The Second Military Survey (1806-1869) map already shows greater activity – the wood exploitation in Koška region was on its way and parts of the woods closer to Podgorač have been cleared to give way to agriculture. The Third Military Survey (1869-1887) map shows more arable land. At the end of the 19th century a large regulation of underground waters was done in Slavonia region which, combined with extensive wood exploitation, could have led to deforestation. Modern period map corresponds to the 19th century situation on the historical maps.

During the 2015 field survey the remains of a village were found between Jelisavac and Breznica Našička, south of today’s road. The material collected there was dated between 13th and 15th century. After the search in historical records, it was concluded that the village in question is Bodugazunfalua/Wostiarouch/Voštarevce. Bösendorfer (1994: 108) mentions the village Bodugazunfalua (Pusta Maria or Budigošće) from 1378 and Wostiarouch from 1407 (Bösendorfer 1994: 119) while Voštarevce is mentioned in Požega defter from 1579 (Sršan 2001: 195) as a village of 10 houses with exploitation of woods around. Pusta Maria is mentioned on the Third Military Survey (1869-1887) map while Voštari on the 19th century Cadastral map. It is also possible that there were two villages, one in the 13th century and one in the 15th (Budigošće and Voštarevce), maybe close by or one after the other.

3. CONCLUSIONS

Very rarely there is an opportunity to work on such complex subject such as landscape dynamics over prehistoric and historic times. The results of the project, so far, confirmed our initial supposition about specific communication routes used over time (Fig.5), although the specific significance of these communications through time was a new discovery. The site positions correspond also to specific time in question although it is fair to suppose some strategically positioned sites on the main communication routes. The settlements in historic times, however, only roughly correspond to the historic records, possibly due to the state of research. Našice region consists of good arable land in the lower regions although it sometimes suffers from flooding, mountainous region of sediment and metamorphic rocks, good clay deposits and dense forests. Today almost the same communication routes are used. The north-south route, connecting Podravina region with Posavina region to the south, also connects central Carpathian region with northern Balkan. East-west communication along Drava river was specifically important over time as it is today. The evolution of agriculture can also be observed over time as the exploitation of wood.

The work is not finished yet and the concluding results will be possible only after it is done. We hereby thank the Našice Local History Museum for making this project possible by putting to our disposal all of its contents.

NOTES

[1] Leader of the project is Dr Zorko Marković; project members are Dr Hrvoje Kalafatić, Dr Kornelija Minichreiter, Katarina Botić and Danimirka Podunavac.
[2] The excavations carried out by the Institute of Archaeology in Spring 2015 on southern by-pass road near Donji Miholjac confirmed that.
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LONG-TERM SPATIAL CHANGES OF NATURAL HABITATS IN THE RURAL LANDSCAPE. USING OLD MAPS AND ARCHIVAL SOURCES FOR LANDSCAPE ASSESSMENT. CASE STUDY FROM CENTRAL BOHEMIA

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ABSTRACT
It is impossible to understand several ecological phenomena without considering the processes that have occurred over the preceding decades, centuries, or longer periods. While maintaining natural habitats is central to reach ecological balance, the total area of these natural habitats has significantly decreased over the last two centuries, particularly during the second half of the 20th century. Significant losses of biodiversity and habitat degradation have occurred in Europe due to a heightened intensity of agricultural land management. In this case study of Central Bohemia, old maps and archival sources were used to illustrate the changes in the proportions of natural habitats over 250 years. Because maps alone cannot fully describe habitat conditions, a proposal for using archival information, and especially written materials, for natural habitat assessments is presented in the paper. Our results show that natural habitats began to decline at the end of 18th century within the intensively farmed region of Central Europe. Over 250 years, the areas that these habitats occupy have decreased by more than 80%. Particularly, wetlands and wet meadows declined during this period. Despite less precise identification of individual habitats in the past, old maps and written archival sources can serve as a useful source of good comparable data for estimating the spatial changes of natural habitats and landscape biodiversity.

Keywords
Agricultural landscape, natural habitat loss, biodiversity, old maps, archival sources, Czech Republic

1. INTRODUCTION

Land use changes over the course of historical development have influenced the presence of different habitat types, which has affected biodiversity levels (Poschlod et al. 2005). Throughout the 20th century, and especially during the second half, significant biodiversity losses and rapid habitat degradation occurred in Europe due to intensified agricultural land management practices (Benton et al. 2003; Donald et al. 2006; Henle et al. 2008). Understanding human disturbance regimes is crucial for the development of effective conservation and ecosystem management plans (Black et al. 1998; Wear and Bolstad 1998).

Numerous studies based on geographic methods have analyzed long-term land use changes to improve knowledge regarding the influences of humans on landscape development (Kümmerle et al. 2006). Historical maps represent a critical source of information for such analyses. The importance of this resource is growing with the application of historical map content, especially in long-term, intensive economic utilization studies in which historical maps have been examined in detail. However, most studies have evaluated relatively young map sources when studying small areas because these data are more readily available (Krause et al. 2011; Mallinis et al. 2011; Jiang et al. 2013).
The European landscape has been shaped by agricultural practices for hundreds of years. In turn, agriculture is deeply influenced by socio-economic conditions, which have affected landscapes in a mutual manner. While the European landscape has been continuously transformed throughout history, changes of increased speed and magnitude have occurred in several landscape features from the 18th century. Most of these changes have been associated with population growth and urbanization processes (Antrop 2005). This trend resulted from social and economic changes that allowed for more effective state and private bureaucratic structures, which produced more documents (e.g., military mapping, cadastral mapping, land registers, and wood registers). While most knowledge regarding landscape development during the previous period was based on case studies and local data, more systematic and complex surveys were conducted from the 18th century onward (Antrop 2005; Skaloš et al. 2012b).

Natural habitat distributions over a longer 250-year period could be assessed by analyzing old maps and written sources. Old large and medium scale maps can only provide partial information for landscapes because many facts and processes cannot be depicted in maps. Other sources (mostly written sources of archival information) may contribute highly accurate information to the data gathered from old maps, but these sources present serious disadvantages. For example, the scant historical information that is available is largely anecdotal and narrative and is not available at appropriate spatial and temporal scales. This complicates the process of drawing comparisons across time and space (Black et al. 1998; Vellend et al. 2013). Thus, written sources are not used as often as they should be. Archive sources were already successfully used to describe flora and vegetation development and history of environmental changes (Foster 1992; McCollin et al. 2000). Data on the changes of natural habitat structures in response to socio-economic changes over a longer time period provide a strong basis for explaining current biodiversity levels in intensively managed landscapes (Gustavsson et al. 2007).

1.1. Study area

The study area is located in the intensively farmed landscape of Central Bohemia in the Czech Republic (Fig. 1). The territory includes 21 cadastral units that cover a total area of 11,321 ha. The terrain in the region predominantly consisted of plains and moderately undulating lands with altitudes of 200 to 250 m. Based on the ecological soil quality evaluation unit map, most of the farmland consists of alluvial and gleysolic soils. While Cambisols prevail at higher altitudes, Rendzinas are found at sites with bedrock outcrops. According to the division of the climatic regions framework, the area belongs to a drier warm region that is characterized by moderate winters with a mean January temperatures of –2 to –3°C. Here, the winter precipitation levels vary from 200 to 300 mm. The summer months are warm with mean June temperatures of 18–19°C, and the precipitation during the growing season varies between 350 and 400 mm.

1.2. A brief survey of historical data

In the period before human activities impacted the region and according to the rubrics of the reconstructed potential natural vegetation map (Mikyška 1968) and the potential natural vegetation map of the Czech Republic (Neuhäuslová et al. 2001), a large section of the region was covered with alluvial forest vegetation, representing the primary vegetation type at the flooded and waterlogged sites (Alnion incanae). The remaining area was covered with oak-hornbeam and lime-oak forests of the Carpinion alliance. Swampy alder and willow carrs communities grew in permanently waterlogged soils. These ecosystems can be classified under the Alnetea glutinosae class or within the Alnion glutinosae and Salicion cinereae alliances. At the frequently and permanently waterlogged sites, communities of willow poplar forests that were classified under the Salicion albae alliance flourished, covering the lowest-elevation areas of the alluvial plains along the large rivers. The vegetation established in the aeolian sands and in the other nutrient-poor
soils formed acidophilus oak-forests (Genisto germanicae-Quercion). In addition, subthermophilous oak forests only (Quercion pubescenti-petraeae) covered very small areas.

Three major periods of landscape development were identified: pre-18th century landscapes, landscapes of the revolution age (the 19th and first half of the 20th century), and post-modern landscapes. Major trends and driving forces (accessibility, urbanization, globalization, and calamity) are largely consistent across Europe (Antrop 2005). Several authors attribute the decreases in traditional landscapes and the losses of natural habitats to two causes: intensification vs. extensification and land abandonment (Vos and Meekes, 1999; Sklenička et al. 2009). Population growth at the end of the 18th century was accompanied by the first manufacturing, industrialization, and urbanization processes, which resulted in the need for more food that led to the intensification of agriculture. These changes occurred during a period of warmer climate from the 1780s to the 1830s (Možný et al. 2012). During this period, fish farming, which has enjoyed a long and rich tradition in the Czech Republic, began to decline. Pond and wet meadow drainage began at the end of the 18th century, and by the second half of the 19th century, the major ponds had disappeared (Pokorná et al. 2014).

The first wave of intensification in the Bohemian and Moravian lowlands was connected with sugar beet growing. The first attempts at growing sugar beets began in the 1830s, and the production of this crop became especially intense from the 1860s onward. Because the sugar beet was a new crop, it stimulated new agricultural methods and landscape management practices. Ponds and wet meadows were quickly drained to obtain extra arable land for sugar beet production (Froněk 2009). Thus, the natural habitats that relied on these environments rapidly declined.

In 1848, the Act on the Abolition of Vassalage and Unfree Labor was signed, which allowed individuals to more easily own, inherit, divide and sell land. During this period, small peasant agriculture flourished.
and was reinforced by the land reforms of the 1920s when larger estates were divided. Consequently, the extent of natural habitats declined further. The strengthened peasant agriculture was common across Europe in the 18th and 19th centuries (Biličík et al. 2001; Skaloš et al. 2012b). In contrast, following the Communist revolution in 1948, the Soviet model of agriculture (large cooperative farms, open space fields, industrial agriculture) was implemented in Czechoslovakia. The devastating impacts of these processes on natural habitats and biodiversity have been well documented in numerous studies (Sklenička et al. 2009; Grešlová Kušková 2013). The only exception to this trend was that the forest habitats grew in inaccessible areas, such as steep slopes and wetlands, where spontaneous afforestation occurred. The processes of field enlargement due to heavy mechanization were not specific to Communist Europe, where such practices were driven by ideological and political forces, but were also realized in Western Europe because of economic forces (Antrop 2005, Skaloš et al. 2012b).

1.3. Data and methods

1.3.1. Current data on the natural habitat distribution

A digitized output of biotope mapping for the Czech Republic was developed during the creation of Natura 2000, and was used to assess the vegetation states. The data were revised in the field and adjusted as necessary based on the biotope mapping methodology (Guth 2002; Guth and Kučera 2005). Natural habitats were classified based on the national interpretation manual of Natura 2000 biotopes (Chytrý et al. 2010).

A general map of the Czech Republic at a scale of 1:10,000 was used as the main map. An analogue map was used for mapping in the field, and its digital version was used for data processing and GIS analysis. In addition, digital maps that were accessible through the geo-portal of the Czech Environmental Information Agency (CENIA) (ortho-photo color aerial images, digital terrain models at a scale of 1:25,000) and of the Institute of Forest Management (ÚHÚL) (e.g., forestland area in the studied region) were used. Consequently, a general summary of information regarding the degradation distributions and levels among the Natura 2000 biotopes that are important to nature conservation was obtained.

1.3.2. Historical maps and other archival sources

Old military maps were used to interpret the natural habitat distributions further across different time horizons. Three sets of military maps were produced for the present land area of the Czech Republic: First Military Maps (1763 – 1783), Second Military Maps (1842 – 1852), and Third Military Maps (1874 – 1880). The scale of the First and Second Military Maps was 1:28,800 and the scale of the Third Military Map was 1:25,000. While the First Military Maps were produced without using accurate surveying and cartographic methods, the Second and Third Military Maps were much more precise and based on the triangulation network (Petrovskí and Mészáros 2010; Skaloš et al. 2011; Skaloš et al. 2012a). These old military maps present topographic information, from which eight categories of natural habitats are identifiable.

Nevertheless, other sources must be studied to delimit and specify the natural habitats because military maps do not specify habitat quality. The First Military Survey is composed of map sheets and written reports. These reports provide detailed descriptions of the terrain, landscape, ponds, streams, wetlands, and road characteristics. The reports are accessible through the National Archive based in Prague. The reports were originally created for military officers to facilitate troop movement and to provide clear arrangements of terrain.

The Second Military Survey was developed in close consultation with the first cadastral mapping process. The topographic components of the military maps were derived from the cadastral maps that were more precise because they were created at a large scale (1:2,880). To obtain precise natural habitat
data for the second military maps, the maps of the stable cadaster and written cadastral reports were used. The characteristics of the meadows, pastures (wet or dry), woods and groves (high or low, deciduous or coniferous) were distinguishable on the cadastral maps. In uncertain cases, the written sheets were examined. These sheets are also accessible through the National Archive based in Prague.

Obtaining the necessary additional information for the Third Military Map was challenging because we could not use the reports that were developed for broader areas. Information on the character of grasslands, forests, groves, and water areas was collected from several partial reports that were stored in regional archives. The Office for the management of forests and ponds for the city of Kutná Hora held in the State District Archive of Kutná Hora was of great use for the forest assessment. Detailed descriptions and management plans for the forests owned by the city of Kutná Hora from the beginning of the 20th century are stored in this archive. Additional materials are stored in two collections of the State Regional Archive based in Prague. The Estate Nové Dvory stores information for the western section of the study area and the Estate Žehušice stores data for the eastern section. The Žehušice estate evaluation report from 1879 was used because it contains detailed descriptions of agricultural lands, including meadows, pastures, and forests. A report produced by the Nové Dvory estate in 1864 provides a general evaluation of this estate with agricultural, grassland, and forest assessments. Both reports have structures that are similar to the cadastral written sheets. Moreover, the reports are more detailed and descriptive, which allows us to obtain valuable information regarding grassland, forest, and surface water quality.

The most crucial step is to find appropriate written sources about landscape and habitats quality in a clearly defined territory. Written reports and old maps should originate from the same time. The ideal situation is when the written report and the maps were made by the same author and the report describes landscape and habitats state (e.g., the report to the First Military Maps). On the other hand, the wide archive research is necessary and information about landscape and habitats quality should be carefully interpreted from scattered sources (Vellend et al. 2013). Archive research is quite time consuming and collaboration between botanist and historian is inevitable.

1.3.3. Data analysis

First, the scanned sheets of the military maps were georeferenced and seven main land use categories were digitalized to obtain suitable data for further GIS analysis (Skaloš et al. 2011). To analyze the spatial changes in the distributions of natural habitats, three land use categories (grassland, forests, and water surfaces) were selected. Then, written archival sources were studied to obtain information about the quality of each patch of the selected land use categories. The archival sources that described the landscape quality allowed us to decide if the assessed patches could be included in the natural habitats analysis or should be omitted because of human degradation. We assessed information about the water regime, management, and grazing intensity of grasslands, the inner structure (share of deciduous and coniferous trees, share of trees and shrubs), forest management, water quality (potable x no potable), and the appearance of littoral zones for water surfaces. The information gained from the written sources could not be quantified. Common historiographical methods (text analysis, inner and outer critics) were used (Black, Macraird, 2007) and information about the quality of the patches was gained for each patch. The patches that were degraded by human activities (e.g., intensive forest management, water pollution) were excluded from further analysis.

Based on the above data, the following eight natural habitat categories (terms according to European Commission Habitats Directive 92/43/EEC) were identified and used to analyze historic changes in their land cover: 1) willow carrs, 2) mosaics of the willow carrs, alluvial forests, and wet Cirsium meadows, 3) alluvial forests and alder carrs, 4) oak-hornbeam forests and acidophilus oak forests, 5) mesic Arrhenatherum meadows, 6) mosaics of mesic Arrhenatherum meadows and wet Cirsium meadows, 7) wet Cirsium meadows, and 8) macrophytic vegetation in naturally eutrophic and mesotrophic still waters.
Many landscape metrics have been developed for the quantification of landscape patterns for studying ecosystem functions and processes. These metrics are typically grouped into following basic types:

- Area metrics
- Patch density and size metrics
- Edge metrics
- Shape metrics
- Core area metrics
- Nearest-neighbor metrics
- Diversity metrics

With respect to natural habitats, the landscape metrics were used to investigate how the spatial structure and distribution of biotopes have changed over last 250 years. Landscape metrics were calculated for four time periods using extensions of Patch Analyst 4.0 and V-Late 1.1 for ArcGIS 9.3.

2. RESULTS AND DISCUSSION

It is generally understood that the highest levels of phytodiversity in the Central European landscape resulted from the historical land-use that occurred during the first half of the 19th century (Zahlheimer 2001; Poschlod et al., 2005). However, our study indicated that the area of species-rich natural habitat began to significantly decline before this period of intensive farming. This area continued to shrink during the last 250 years to its current size of 16% of the original area (Tab. 1). This decrease main resulted from the increasing area of arable land with decreasing water and wetland areas (Skaloš et al. 2011).

Furthermore, adverse developments have resulted in habitat fragmentation, which is characterized by reductions in habitat size, increases in the number of patches and decreases in the average patch sizes (Fahrig 2003). These developments have adverse effects on species richness (Kiviniemi and Erickson 2002; Krause et al. 2011) and the genetic viabilities of populations and individual species (Cousins et al. 2007; Hanski 2011; Münzbergová et al. 2013).

Following 1780, the study area was influenced by a number of socio-economic changes that were accompanied by land-use changes. The main trend that influenced the natural habitats in the area was the land use intensification. Between 1780 and 1840, the willow carrs, alluvial forest, and wet Cirsium meadow mosaic vegetation areas, which were primarily used for grazing until that time, decreased significantly (by 88%). Due to increasing demands for arable lands for feeding growing populations, these habitats were typically converted into wet and possibly mesic meadows. Areas of existing meadow vegetation were converted into arable land and further used for arable production (Skaloš et al. 2011). The elimination of a number of ponds and their conversion to arable land was a general trend in the fertile lowlands (Pokorná et al. 2014). However, the area of macrophyte vegetation in the naturally eutrophic still water also declined (area by 63%, number of patches by 62%). Because of the development of farmland drainage systems, the area of mesic meadows significantly increased (by 500 ha). In addition, moderate decreases in the wet meadow area occurred (by 4%), which represented the most common natural habitat at the time. The alluvial forest area did not undergo any significant changes. However, the area of the natural oak forest did change significantly (decline by 89%) when this area was converted to coniferous monoculture. The model area was significantly influenced by the landscape designs in large areas surrounding the Kačina and Žehušice manors. Because designed landscapes were expected to be beautiful, pleasant, and productive (Antrop 2005), a greater proportion of wet and mesic meadows, woods, groves, game parks, and ponds were preserved than in the common landscape.

The second period of the study (1840–1880) showed the most significant increase in the share of arable soil, which involved transforming additional areas into arable lands for crop and sugar beet production. The increased need for arable land resulted from the growing population, the process of urbanization, and
the planting of new plants for the food industry. Lowlands supplied the towns and cities with food (Skaloš et al. 2012b). Because sugar beet production reached its first peak in the 1860s (Froněk 2009), a sugar factory was built in the model area. Because the design activities of the previous period had exhausted the financial resources of aristocratic families (Chotek, Thun-Hohenstein), the designed landscapes (mainly ponds) were transformed into more profitable arable lands. The conversion of meadows, pastures, and ponds into arable lands resulted in significant declines in all forms of meadow vegetation and decreases in the water areas with macrophyte vegetation. Decreases in the alluvial forests (64% of the total area) corresponded with their gradual conversion to meadow vegetation, arable land, and pine monocultures. Remnants of alluvial forest showed a high degree of fragmentation. In contrast, the natural oak forests were restored through changes in cultivation methods and through the afforestation of certain meadow areas and unfarmed areas.

Finally, the third period of the study (1880–2010) is not only the longest but also the most turbulent period. Trends that began during the second period (the intensification of small-scale peasant agriculture) continued until 1950. After 1950, the situation changed entirely as cooperative farms with even larger open fields were supported by political representatives (Bičík et al. 2001; Grešlová Kušková 2013; Skaloš et al. 2012b). These trends caused wet meadows to nearly vanish (decline of 99%). However, other wetland habitats, such as willow carrs and macrophyte vegetation in still water, were preserved to a minimal extent and exhibited high degrees of fragmentation. This fragmentation mainly resulted from the development of major intensive wetland drainage systems and river channelization practices that were executed in the 1970s in connection with the development of large-scale intensive farming. Large land parcels developed, large-scale agricultural production centers were built, and synthetic fertilizers and pesticides were applied extensively. Because of this development, the species richness significantly decreased in the remaining natural habitats.

Table 1. Natural habitat area dynamics over the 1st (1780–1840), 2nd (1840–1880), and 3rd (1880–2010) periods of analysis (x – no data recorded).

<table>
<thead>
<tr>
<th>Habitat category</th>
<th>Area change in ha</th>
<th>Area change in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st period</td>
<td>2nd period</td>
</tr>
<tr>
<td>Willow carrs</td>
<td>-155.5</td>
<td>0</td>
</tr>
<tr>
<td>Mosaic of willow carrs, alluvial forests and wet <em>Cirsium</em> meadows</td>
<td>-593.8</td>
<td>13.3</td>
</tr>
<tr>
<td>Alluvial forests and alder carrs</td>
<td>51.7</td>
<td>-405.8</td>
</tr>
<tr>
<td>Oak-hornbeam forests and acidophilous oak forests</td>
<td>-563.6</td>
<td>118.9</td>
</tr>
<tr>
<td>Mesic <em>Arrhenatherum</em> meadows</td>
<td>499.7</td>
<td>-346.3</td>
</tr>
<tr>
<td>Mosaic of mesic <em>Arrhenatherum</em> meadows and wet <em>Cirsium</em> meadows</td>
<td>-6.7</td>
<td>7.6</td>
</tr>
<tr>
<td>Wet <em>Cirsium</em> meadows</td>
<td>-65.9</td>
<td>-680.8</td>
</tr>
<tr>
<td>Macrophyte vegetation of naturally eutrophic and mesotrophic still waters</td>
<td>-386.6</td>
<td>-204.2</td>
</tr>
<tr>
<td>Total</td>
<td>-1220.7</td>
<td>-1497.1</td>
</tr>
</tbody>
</table>
3. CONCLUSIONS

Our case study of Central Bohemia indicates that in the intensively farmed landscape of Central Europe, natural habitats began to decline as early as the end of the 18th century. Over the course of 250 years, the areas of these habitats decreased by more than 80%. Only a few degraded patches of formerly widespread natural wet meadows were preserved until today. Overall, the area has declined by 99%. By the middle of the 19th century, the areas of the other types of vegetation that were bound to water and the wet sites declined dramatically. The area of macrophyte vegetation in the naturally eutrophic and mesotrophic still water was reduced by 95%. Willow carrs specifically experienced a decrease of 98%, while mosaics of the willow carrs, wet Cirsium meadow, and alder carrs decreased by 100%. These biotopes are currently present in the territory only to a minimal extent. Areas of oak-hornbeam forest, acidophilus oak forest, and thermophilus oak forest by the middle of the 19th century were primarily converted into monocultures of coniferous trees. Similarly, the area of alluvial forests decreased in the middle of the 19th century (Šantrůčková et al. 2015).

The results of our study demonstrate that the historical-economic changes reflected through changes in land-use play an important role in the development of individual natural habitats. The following main factors are responsible for the decline and fragmentation of natural habitats. A higher demand for arable lands associated with the production of sugar beets resulted in decreasing areas of open water, wet meadows, and other vegetation areas that were bound to wet sites. The requirement of wood production from pine and spruce trees resulted in the conversion of natural forests to monocultures of coniferous trees.

However, the present state of natural habitats is also influenced by the site history (Krause et al. 2011). Well-preserved natural habitats mainly exist in parks near manors and in locations conditioned by nature-friendly human activities for the conservation of natural flora and vegetation ecosystems. This point was also raised by Kowarik et al. (1998).

Acknowledgment

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BIBLIOGRAPHY


THE ARCHEOLOGICAL HERITAGE IN THE URBAN JUNGLE –
CASE STUDY OF LODZ

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ABSTRACT
The archaeological heritage is the oldest manifestation of human activity that creates historically shaped space with
natural factors. Its value, which forms the identity of humanity cannot be overestimated, but it is a legacy difficult to see,
as it is usually hidden under the ground. How to effectively protect such a fragile and difficult to identify resource?

As part of the work on a new strategic document of the city - the study of the conditions and development approaches
of Lodz urban planning, one of the major issues which has been diagnosed are the traces of settlement from various
prehistoric eras and from different periods of the modern city development. An original method for the analysis of the
source data has been developed. On this basis and as a result of cooperation between municipal urban planning office
and voivodship conservational services, and in collaboration with the experts, it was possible to diagnose the landscapes
and the archaeological heritage. This action resulted in developing a proposal for protection arrangements. The planning
decisions in this area complement the tools of conservational protection and are an example of a common concern for
multithreaded cultural landscape of our city.

Keywords
archaeological heritage, urban planning, cultural landscape

1. INTRODUCTION

"Since the sites and archaeological treasures are fragile and irreplaceable resources, they must be protected,
managed and preserved in the face of numerous justified (and less justified) pressures of modern society
which lead to the destruction of the historic environment" (Barford 1998, s. 157)

The archaeological heritage being the oldest testimony to human activity is a key value in building the
identity and collective memory. Its value cannot be overestimated, however, it is not taken into account
by the contemporary evaluation based on visual or financial attractiveness. Even the current definition of
cultural landscape states that it is "perceived by people space ...". Therefore, in terms of the applicable
provisions, can the archaeological heritage be called the cultural landscape? The questions arise then,
how to discover, how to use and how to protect so fragile, hidden and ambiguous resource?

It is certainly easier to gain social acceptance for the protection of visible and more spectacular
monuments. In the case of the archaeological heritage it is harder to obtain the acceptance for archaeological
sites that are e.g. the terrain remains of former settlements, burial barrows, parts of buildings or their more
or less successful "reconstructions". More difficult to justify is the protection of archaeological sites and
items hidden under the earth, such as the remnants of human activity present in archaeological sequence
or stratification or less attractive visually, smaller everyday items found in them. The hardest part, however,
is to establish the rules of protection for the areas where potentially could be traces of settlement, which
might exist due to some historical assumptions, and it is not yet confirmed by archaeological research.

The current law does not provide a very wide range of possibilities for the protection of the
archaeological heritage. The main responsibility of care and protection of the resource related to the
voivodship conservational services. However, in the wake of the imposed duties do not go statutory tools
that would allow the financing of archaeological research and conservation programs prior to investment
processes.

„Recalling that the archaeological heritage is essential to the knowledge of the history of humanity”
and that it is the source of the European collective memory (European Convention… 1996, 1-2), it is
clear that its protection cannot be solely the concern of conservational services, but it should be of interest
to the whole society.

1.1. Remarks / Methodology

The study of the conditions and development approaches of Lodz urban planning (hereinafter used as
Study...) is a mandatory spatial document of a municipality drawn up for the whole of its area. This is a
strategic document which determines the main directions of development as well as determines among
others: areas and the rules of protection for cultural heritage, monuments and goods of contemporary
heritage (Law on Spatial… 2003, Article 10). This document is adopted by the municipal council, but
it does not constitute the local law. Although this document it is not the local law, its findings permit to
develop a coherent spatial policy on a city-wide scale, including the protection of heritage and cultural
landscape. Study... and its records are a later obligatory starting point for agreements of the local plans,
which are the acts of local law.

As part of preparations of the Study... a discussion was held and an attempt was made to diagnose
the elements of cultural heritage. One of the most important diagnosed issues were traces of settlements
from different eras and different prehistoric periods of development of the area located today within the
city boundaries. The oldest traces of settlement are identified as archaeological sites in the research-
and-registration program called Archaeological Photos of Poland (hereinafter used as AZP). Independent
research was undertaken in the field of: rural settlement on the areas incorporated into the administrative
boundaries of the city within its territorial development, other settlements from the period of formation and
development of the industrial city.

Not only our own studies were very important, commissioned papers and elaborations but also
taking into account the findings recorded in documents and policies of the city and the region, as well
as conducting expert workshops and community discussion. They were attended by representatives
of municipal planning departments, provincial conservational services, lawyers, representatives of the
National Heritage Institute, Society for the Protection of Monuments, university professors and other
guests.

In the work of all participants two issues have been juxtaposed with each other. The need of
archaeological heritage protection and the protection of areas where it could potentially be and the need to
specify possible directions and principles of spatial planning and development of the city. Voivodship Office
for the Cultural Heritage Protection for the purposes of this document released all information concerning
the collection of AZP from the area of Lodz, and also developed a written justification for each of the
planned zones of archaeological protection.
2. LODZ AS “THE NOT OBVIOUS CITY”

„The origins of the oldest settlement of Lodz – Wieś Łodzia (Lodz Village) - are not sufficiently known”. The first mention about it comes from the first half of the fourteenth century, and at the end of the fourteenth century Bishop John Kropidło relocated villages Łodzia and Widzewnica under German town law, as one parish Wieś Łodzia (under the one office of the village leader). The provost, in addition to the ground, was also given a mill in Widzew, later changed into Wójtowski Młyn (Village Mayor’s Mill) (Koter 2002, card P-03). (Figs. 1 and 2)

Thus, in a period when some cities had already existed and others were developing, Lodz was just a village. Lodz was granted town laws based on the Magdeburg Rights in 1414 and in 1423 the Privilege of the City Foundation given by king Władysław Jagiełło confirmed the bishop town location. The town developed poorly, it was located outside the main trade routes, in a wooded area, and the townspeople mainly worked in the fields. Until the beginning of the nineteenth century, Lodz remained dormant, and the area of urban development included only approx. 20 hectares, focusing on the market and several streets running out from it. It can be concluded that Lodz has never been a medieval, fully developed town.

2.1. The state of the research of the archaeological heritage in Lodz, the needs and the scope of protection

In 1980, AZP was entering the implementation phase. Lodz was then the capital of the smallest province in Poland – the voivodship of Lodz. Within the limits of the city at the time, there were three archaeological sites written into the Register of Monuments. After the completion of the AZP research in 1987, the archaeological sites and items known from archival materials, yet without verifiable location, dominated in
the urbanized part of the city, e.g. "on a sand dune in the Park Zdrowie (Health Park) - a gift of master ...". The new monuments with an identified location were found in the areas used for agriculture e.g. in the area of Lublinek or Chocianowice. Some of it was destroyed in the course of the investment in the 70s of the twentieth century, such as Przeworsk burial site, at which place Retkinia Botanic housing estate was built. In addition, according to the principles at the time and the substantive guidelines, no information about the sites from the earlier time than the XIV-XV was registered in the AZP. The situation changed in the second half of the 90s of the twentieth century. On the basis of the Municipal Office Protection of Heritage grant, a verification of three AZP areas covering the southern part of Lodz was conducted (Zawilski 2000). At that time, as part of the research program "Prehistory of Lodz agglomeration", some activities related to monitoring all kinds of investments were carried out by the Institute of Archaeology. They resulted in submitting to the archaeological conservator about 500 copies of the declaration of new discoveries throughout the city. It was only in 2007 that some of them were written in the AZP register.

After 2003 when a new Law on the Protection and Preservation of Historic Monuments came into force and the protection of archaeological sites was transferred from the Museum of Archaeology and Ethnography in Lodz to the Regional Office Protection of Heritage in Lodz, on the basis of new regulations, investments began to be overseen with respect to archaeological heritage discovery and its systematic registration to AZP started. This coincided with large investments, such as expansion of the airport Lublinek or the beginning of the construction of the Port of Lodz - the Lodz Ikea. Lodz, a city without archaeology received its new chance to reveal what curiosities are hidden under familiar buildings from the nineteenth century.

The completion time of the AZP registration and the transfer of responsibilities for the protection of the archaeological heritage to the Regional Conservation Services (hereinafter used as WKZ) coincides with the entry into force of the new Law on Spatial Planning and Development (Law on Spatial... 2003). Legislative change made it necessary to supplement the Study... in force since 2002. The city set about initially to changing it (2006), however, ultimately the decision was made to start work on a new document.
The team working on conditions of the Study..., in cooperation with WKZ prepared then for the first time a collective map of all archaeological sites and items registered to the AZP in the area of Lodz. On this basis as well as taking into account the current knowledge concerning the location of the former settlement, the boundaries of the areas suggested as conservation and archaeological observations zones were initially set. Archaeological observation zones of line investments were an additional and interesting proposal. Unfortunately, at the stage of formulating the Study... directions, as a result of received opinions, numerous changes were introduced to the document including the removal of all zones concerning the conservational and archaeological protection, replacing them with only general recommendations. According to the adopted in 2010 Study... the introduction of protection zones takes place only at the stage of the Local Urban Planning Act. The legal decisions of local plans are one of the statutory forms of protection of heritage. They are often the only form of protection of monuments listed in the Records of Monuments (hereinafter used as GEZ), including archaeological monuments recorded in AZP.

Currently, Local Urban Planning Acts are successively being developed and adopted, even though their number is still not sufficient due to the large amount of heritage in the city, including the ones demonstrated in the GEZ and AZP. In this situation, the resource recognition of the "Great Lodz" remains is continued mainly based on the provisions related to WKZ and the Register of Monuments. At the same time, registration cards are being completed with the newly discovered archaeological sites. It should be noted that archaeological sites are often discovered in places that to researchers of urban development in Lodz seemed to be void of the pre-XIX settlement. (Koter 2002, card P-03).

Research needs, however, are much greater than just a mechanical resource expansion. What is needed is the analysis which would link the knowledge of the early and late medieval settlements remains with archaeological discoveries, particularly those made while carrying out research on vast investments. What is needed is an application and analysis of the resource resulting from the archaeological discoveries and cartographic information in the GIS system. The implementation of these projects, unfortunately, is beyond the ability of one archaeologist at the protection of heritage office although it would account for the best tool supporting the management of archaeological heritage in the city.

It is so important because the modern approach to the cultural landscape is not only its protection, but also active management of the heritage. The fundamentals of management have been determined in the European Convention on the Protection of the Archaeological Heritage from La Valetta, in which Article 5 obliges parties to make it possible to change development plans in such a way that they do not have a negative impact on the heritage. It is recommended that new discoveries should be introduced to the resources and the heritage itself ought to be preserved "in situ". In addition, the availability of the archaeological heritage should not have a negative impact on the archaeological sites and items. The Convention ratified by Poland in 1996 contributed to changes in the laws and a large part of the directives within it was introduced to the Polish law, especially in the Law on the Protection and Preservation of Historic Monuments (Law on the Protection... 2003). [Note 1] This Act has undergone many changes and today we can say that, in accordance with its arrangements the archaeological heritage has the most protection capabilities. It is not entirely true. The rules in Act are formulated in such a way that the archaeological sites listed in Register of Monuments are protected with the force of law while sites listed in the GEZ have a certain way of protection only if there is an urban plan of this site.

For now, in Lodz urban plans cover only a small part of the city, so the scope of archaeological sites protection is also very limited. Other protection agreements are being introduced ad hoc as the recommendations of the preservation to administrative decisions (e.g. a decision on land development conditions and of spatial planning).

It should be further noted that registered archaeological sites are protected by decision on land development conditions and by other spatial planning documents provided their inclusion in the municipal Record of Monuments. In this case, only the parts of these heritage, which have been registered in the AZP, are usually protected and transferred to the GEZ. It is not possible to protect the archaeological
sequence or stratification which constitute the composition of the archaeological sites, but due to the rules of determining the site range within the AZP, they have been left outside range drawn on maps. To protect these archaeological sequences or stratifications, archaeological protection zones are used. Their absence in the current Study... significantly reduces the possibility of determining recommendations of protection in decision on land development conditions or decisions about investment of public purposes conditions. Hence abandoning the idea of conservational and archaeological protection zones in the current Study of 2010 hinders significantly the exercising of the systematic conservational protection and strategic heritage management in the whole city. In connection with the next update of the Study document, works on the restoration of the systematic and the zonal approach to the protection of archaeological sites have been resumed. Currently we have developed new rules which will be discussed later in this paper.

3. HISTORICAL SETTLEMENTS IN THE STRUCTURE OF THE CURRENT LODZ

3.1. Stratigraphy as evidence of historical settlement of the Lodz and its surrounding areas

The settlement beginnings in the area of Lodz was already characterized some time ago by Zawilski Paul in two documents (Zawilski 2000: 5; Zawilski 2002: card P-03). When it comes to the oldest finds from the Stone Age, they come from the Palaeolithic, so from the time when people learned to make tools and led the hunter- gatherer lives. The most recent research has not provided any new information and still the only find here is the one of the Łaskowice (Zawilski 2000: 5). In the Mesolithic, so the period when the mastery of man to produce tools led to a significant differentiation and precision of stone tools, people still hunted and reluctantly settled. This period in Lodz represents a few finds from the south-western part of the city, from areas near the Bałutka and Ner rivers. The finds of Komornicka, Chojnice-Pierkowska and Janistawicka culture can be found here. (Zawilski 2000:.6). Recent studies do not bring any further discoveries also for this period of history. In the Neolithic Age, man as a species, mastered plant cultivation and animal husbandry, and therefore began to lead a settled life and make pottery. Among others on the basis of the pottery the archaeological cultures are defined in the prehistoric archaeology. The area of Lodz is frequently represented by the Funnelbeaker Culture, one can also find traces of the Linear Pottery Culture period, the cultures of Globular Amphora and Corded Ware. These findings are also located on the south west side of Lodz, near the Ner river and its tributaries Bałutka and Olechówka. The database on the settlement during this chronological period increased dramatically during the researches at the Lodz Władysław Reymont Airport Ltd. (so called Lublinek) and in the Ikea area.

Three cultures of the Bronze Age are already represented in large numbers, they are Trzcinecka Culture, Łużycka (Lusatian) Culture and Pomorska Culture. This settlement now occupies new areas and traces of these cultures can be seen in Lodz, on the majority of rivers banks in the western, southwestern, southern and south-eastern part of today's city: on the Ner, Sokołówka, Dobrzynka and Olechówka, Łódka and Bałutka rivers and their smaller tributaries. Some recognized and frequently examined graveyard are also connected with this period. High density of settlements of these cultures were recently found in the area of the Ner river while building the Pabianice bypass road called S14 bis.

The last period prior to historical age is the Iron Age represented by the declining settlement of Łużycka Culture and the Przeworsk Culture. This settlement is still focused on the earlier mentioned major rivers: Ner and Bzura with their larger tributaries, with a particular density of finds in the area where Dobrzynka river flows into the Ner river.

Early Middle Ages and late Middle Ages was a period when the settlement still can be found on the land near the Ner river banks and its tributaries, but there are also traces of discoveries in the area of the later village Radogoszcz in the northern part of today's city, Huta Jagodnica, the village of Brus and Retkinia in the west or on the east side, in Nowosolina and Widzew village. The latest findings from the exploration on the highway A1 also revealed some remains of a large settlement in the eastern part
in village called Popielarnia, although no mapping sources have ever mentioned this village from the eighteenth or nineteenth century. These findings show that the lack of sites in the records AZP is not a matter of lack of the former settlement, but rather it is a problem of insufficient identification of areas of today's city.

Settlements of Modern Age (from the seventeenth century) registered with archaeological methods can be identified with the village range described in the literature, for example on the map in Atlas of the City of Lodz. One of these maps presents settlement network from the beginning of the nineteenth century with: mills, glass factories and farms.

Currently, the archaeological sites connected with much more modern history, such as the former training ground Lodz Brus, Chapels in Łagiewniki Forest are being registered in the AZP. [Note 2] (Lechowicz, Nierchlewksa 2007).

3.2. Settlement development in the pre-industrial period

Lodz is located near the main watershed of the Vistula and the Oder rivers, at the junction of two mesoregions: Wzniesienia Łódzkie (Lodz Hills, part of the macro-region of Wzniesienia Południowo-mazowieckie [South - Masovian Hills]) and Wysoczyzna Łaska (Lask Upland, part of the macro-region of Wzniesienia Południowo-mazowieckie [South-Greater Poland Lowlands]). The settlement and economic development of Lodz, as well as the one of the surrounding villages was strongly determined by the physical-geographical terms and conditions (Koter 1980: 18 – 21, 26-33). Despite unfavourable settlement conditions in the area within the administrative boundaries of the current city, "nearly 30 villages and several settlements of a proto-industrial character - water mills, iron ores factories and smithies were founded in the Middle Ages" (e.g. Mileszki, Kalny and Radogoszcz). The village settlements were compact with the prevalence of streets of one built up side. In the nineteenth century, they were being rebuilt (mainly as a result of enfranchising regulations). To the present day few relics of that time systems have survived (Koter 2002: card P-04). (Fig. 3) In the absence of or due to poor spatial and landscape readability of old, rural settlement systems, all the more an emphasis should be placed on any research methods, including archaeological methods, allowing learning about this part of history and the identity of our city.

Elements associated with the medieval city can still be found on the map of the contemporary Lodz. Buildings from that time have not survived but some elements stand out in the spatial structure: the Old Town area with the market place and the layout of the streets, as well as the northern border so-called „Key of Lodz" with former fields lines which divide diagonally the contemporary urban planning quarters in the western part of downtown. In the eighteenth and early nineteenth century successively colonies and settlements appears on the territory which is now called Lodz. It was mainly a period of settlements founded due to private initiatives (so called Olęderska Colonization) in the estates: Chojny, Mileszki, Radogoszcz and Kalny. It was also the time when mid-forest settlements appeared, later often transformed into agricultural settlements.

The next type of colonies founded after 1796 were regular Prussian Colonies (in the geometrical, row shape, so called rzędówka). Some examples of these are Górny Wiączyń and Dolny Wiączyń (Upper and Lower Wiączyń) and a unique radial colony-Nowosolina. Traces of colonies and settlements from this period are dominantly clear on the plan of modern Lodz (mainly in the layout of their streets) (Koter 2012: card P-61).

3.3. Modern Age – an industrial city

The development of the nineteenth century city was integrally linked to the emerging settlements, and later to the arousing industrial factories and its spatial planning strongly determined by the location possibilities of production technologies. The houses which were used as workshops by the first settlers were built in
regularly laid out colonies and industrial settlements: Nowe Miasto (New Town), Łódka, Ślązaki (Silesian), Nowa Łódka and later in the Nova Dzielnica (New District) and Wiązowa District. The buildings initially localized along the newly-set out main streets and roads, over time, began to spread to the entire town area. The dynamic development of the textile industry and the accompanying spontaneous development
of the city resulted in the emergence of a new, more intensive housing development, including the characteristic for Lodz landscape: terraced houses, workers' houses, residences of manufacturers and representative buildings of public use, religious buildings etc. The new buildings replaced gradually one-storey handcrafted houses from the first half of the nineteenth century.

The development of the industrial city influenced also the adjoining villages and settlements. Some of them were incorporated and rebuilt, among others: Stara Wieś (Old Village), Wólka, Widzew and Zarzew.

In the initial period of the city development, bigger production complexes were located in the river valleys (especially of Jasień river and Łódka river), which was associated with the technological process using water. Later, in the second half of the nineteenth century, industrial complexes emerged in the town areas and intermingled with other buildings of the city. In this way there were formed both: multi-functional downtown of Lodz and isolated enclaves – industrial historical districts being a border of urban development on the south and north side of the city (in particular the so-called district of factories: Posiadła Wodno – Fabryczne). During such a rapid growth of the city, its spatial development was out of control (Salm, Wesolowski 1992: 7).

3.4. The contemporary city – conclusion

The landscape of the modern city has taken shape as a result of successive accumulation. In Lodz this development, though launched in Medieval Times, actually took place in a short (for a city) time starting from the 20s of the nineteenth century and is still continuing. The city landscape resulting from the planned development in the first half of the nineteenth century, with the passage of time and the development of the buildings, has been significantly transformed. Despite this, a large part of the downtown has a strongly defined and clear urban structure, as well as a distinctive, compact building structure. However, the cultural landscape relations of the peripheral areas of the city have been shaken considerably. The historical settlements were gradually absorbed by the expanding nineteenth century city. After World War II these areas, to a large extent, became the ground for building housing estates and industrial districts, localized peripherally in relation to the city of the nineteenth century. In our times the process of blurring and "disappearance" of old villages and settlements has been almost entirely completed. The causes of this process were: the exchange of buildings, transformations and regulation of the geographical environment and the secondary parcelling out and expansion of buildings of former fields (which are the natural settlement foregrounds and an integral component of the village).

The foreland of the city, river valleys, old settlements and surrounding villages are often non-obvious scenery of the city, disappearing forever, whose last traces can be seen on the surface of the earth, but sometimes its only evidence are relics buried underground (Fig. 9).

4. HIDDEN CULTURAL LANDSCAPE - CONSERVATIONAL AND PLANNING DILEMMAS

A statutory definition of the archaeological site implies its hiddenness. It is a “stationary (immovable) heritage, which is the surface, underground or underwater remains of existence and human activity, composed of cultural stratification and objects or their signs hidden in it or archaeological items” (Law on the Protection… 2003, Art. 3, item 4).

The ruins of castles, burial mounds, and boroughs from the middle ages or conical boroughs are obvious monuments, one can see them on the surface, even if their form is greatly reduced. But how to convince the public to protect the settlements and flat graveyards, that are not visible (e.g. Chocianowice – Fig. 4). If someone were to liquidate all gravestones at Powązki in Warsaw, or to level the ground, the memory of this place would survive as long as would live the people who remember about this place. But could the memory of that place survive two thousand or even one thousand years?
Under the ground, there are completely invisible places where people used to live. Sometimes they are even large villages, functioning for hundreds of years - e.g. Settlement of Łużycka Culture, along with a related graveyard, discovered during exploration works prior to the construction of the Lodz IKEA. Sometimes such a landscape can be observed by the use of non-invasive methods, especially if the researcher will show a lot of patience and have a lot of luck. The discovery of the old town Nieszawa with the performance of aerial photos (discovery of Mr. Wiesław Stepien) is an example of a reward for patient research. The old city Dzwonowo, whose discovery is attributed to Martin Krzepkowski is the second example of persistent research (Świątek 2016). The third city discovered in a similar way is old Szamotuły (discovery by prof. Vladimir Rączkowski). Photos or an analysis of the geophysical surveys results, which extremely affect the imagination, show us something non-observable in our lives, i.e. the old world in all its variability (Fig. 9).

Some attempts to visualize the immovable archaeological sites (Karpacka Trojan Carpathian Troy) or the Settlement on the Wolin Island), but they do not show the complexity of the cultural landscape or its variability. They do not account for changes and do not show the processes taking place in the landscape. In today's world as part of interdisciplinary research, archaeologists conduct research not only into the sites, but the entire cultural landscape in individual parts of history. They also participate in interdisciplinary research of the landscape changes in the field called: the archaeology of the landscape.

There are various threats to the archaeological heritage. It's not just building, infrastructure or road investments, is also farming, especially deep ploughing since the introduction of machines for land reclamation up to 50 cm into the ground. The economy associated with afforestation or arranging greenery. However, the biggest threat is the lack of public awareness that the archaeological heritage are not just objects but the whole knowledge closed in earth layers. This is something that in common awareness is perceived as non-existent. Since the oldest inhabitants of the village or city cannot remember it means that something is not there. As it does not rise above the ground this means that it is no there. Even if investors become acquainted with a planning document or AZP records in most cases they believe that the archaeologists want to protect their points on the map. The hardest fact is that even the binding law allows the protection only of the archeological points (sites) registered on the map. Recognition of archaeological sites like in Old Nieszawa or Szamotuły (First Location), is rare. Archaeological sites are unpredictable a little like a box of chocolates without packaging - you never know what you're going to get.
4.1. Conditions

Changes in the *Law on the Protection and Preservation of Historic Monuments* which took place because of coming to force the law so-called: "Landscape Act" have caused, among others, redefinition of the cultural landscape term. So far, cultural landscape has been understood as a "space historically shaped by human activities, containing the products of civilization and the elements of nature." Nowadays after last year's changes, the cultural landscape definition means: "the space perceived by people as the one containing elements of nature and products of civilization, historically formed as a result of natural factors and human activities." This change has a significant impact on the classification of archaeological heritage or landscapes often hidden under the ground. Doubts also appear in case of other precious relics hidden from the eyes of people, such as mines (including *Wieliczka*, *Bochnia*), technical monuments in the form of underground construction or engineering objects (e.g. subway tunnels, channels and sewage chambers), underground structures or their parts (e.g. cellars) post-military hidden objects (e.g. the bunkers, tunnels) and many others. The examples of objects mentioned above, even though they are monuments or archaeological sites and an integral component of the landscape, according to current legislation, they cannot be called the cultural landscape. Such definition calls into question the equality of historical heritage in view of law, and thus weakens their position in relation to other cultural resources.

This is not consistent with UNESCO current conventions, which emphasize the need to protect and promote the diversity of cultural expressions, as well as the equality of all historic monuments and sites. (Convention Concerning the Protection... 1972 and Convention on the Protection... 2005). [Note 3]

But above all, such an understanding of cultural landscape does not reflect a fuller definition adopted in the Recommendation of UNESCO on the historic urban landscape, which specifies that: "The historic urban landscape is an urban area understood as an impact of historic layering of cultural and environmental values and as the presence of attributes, beyond the concept of "historic centre" or "complex" seen in the wider context of the city and taking into account its geographical position." (Recommendation on the Historic...2011, preamble). This definition is much more extensive, and fully reflects the concept of the historical, cultural landscape and accommodates doubtlessly the archaeological heritage term. [Note 4]
4.2. An archaeological site

Unambiguously defined and the most obvious for us are our archaeological sites listed in Register of Monuments. Due to the nature of Lodz, in the city there are only three sites included in the Regional Register of Monuments: the two early medieval settlements - in Chocianowice, on the southern slope of the Ner valley (Fig. 4) and the mansion on a hill in the Mickiewicz Park. [Note 5] Other archaeological sites (over 450), according to the AZP area cards, form part of the Municipal Record of Monuments.

Previously quoted definition of an archaeological site exhaustively describes what the archaeological sites and items are. It is a term perfectly describing the most important issues of what archaeologists face on a daily basis. It also shows their duality. Before 2003 archaeologists used the terms resulting from tradition and they told a difference between an archaeological site and an archaeological heritage (often item) and the current law at the same time merged and stressed this duality. The common understanding of these terms is that the archaeological site is a fixed part of the monument, whereas what is commonly called the archaeological item which is movable and made by a man. Such terminology is also confirmed by the interpretation of the terms concerning heritage of archaeological site developed by the National Heritage Institute (NID), the Minister of Culture and National Heritage institution.

However, what is characteristic about archaeological heritage is also the fact that the traces of former settlements, and thus those undiscovered and undisclosed archaeological sites, may be situated as well in other suppositious places. How then to treat and protect potential areas of the archaeological heritage?

Regulations require monuments protection irrespectively of their age, level of recognition and conservation status. The provisions of the law on monuments protection also define protection goals, the most important of which is the preservation and development of historical sites, thwarting the destruction and misuse of them. One of the method to achieve these goals is to include protection tasks in spatial planning and management while shaping the environment (Law on the Protection… 2003, Art. 4 and 5).

The protection system of monuments provides four forms of protection: 1. entry in the Register of Monuments, 2. recognition as a monument of history, 3. creating a cultural park and 4. establishing protection in urban planning documents: the local urban planning act, decisions on urban development, decisions on public goal location or a decision permitting road investment etc. (Law on the Protection… 2003, Art. 7).

Fig.6. Modern Age archaeological discoveries, the construction of the mill. Photographed during archaeological research on the Wójtowski Młyn (Village Mayor’s Mill). photo by Zbigniew Rybacki, 2010.
The *Record of Monuments* is not a form of monuments protection, but it is the basis for both issuing the mentioned above decisions and it must be obligatorily included in the Study... and *local urban planning acts*.

### 4.3. An archaeological sites and items record (AZP)

The record of archaeological AZP sites was founded as a research - registration program in the late 70’s and 80’s of the XX century. [Note 6] The way of keeping records was repeatedly discussed and debated (Jaskanis 1981, 1996). On Archaeological Site Cards (KESA) such facts are marked as location or surface coverage of movable archaeological items or land form (even site has such a one) or the current range of archaeological research. Since the settlements from different eras are often layered, then at one AZP site several settlement facts are registered (e.g. as for Lodz at the tip of the *Dobrzynka river to the Ner river*). Therefore, on the basis of the surface research it is impossible to determine the actual extent of each of them.

At the time when the AZP resource was being created for Lodz there was a problem with access to undistorted maps, taking aerial photographs, and at the beginning of the program, even with free moving on the areas (in the early 80s of the twentieth century). Maps available to record the resources could be purchased only in the scale of 1:25 000, and only confidential maps for official use were at a scale of 1:10 000. The transfer of data from these maps (of distorted topographic facts from 60s and 70s of the XX century) onto contemporary aerial-photo maps or geodesic ones in scale 1: 1000 or 1: 2000, or in the study case 1:25 000 is a huge challenge. Today, every little archaeological site can be tracked with GPS, formerly sites were marked according to landmarks. After 35 years even Lodz has changed to such an extent that a significant portion of these landmarks no longer exists. The question arises then, how to verify and monitor the archaeological asset? Non-invasive methods located in the urban such as georadars or magnetometers rarely do not work due to the large number of factors influencing the results; among other things, high voltage power lines, underground electric infrastructure, contemporary architecture "riddled" with metals. Aerial photographs, for obvious reasons, will show us the modern city. These methods are suited to only rural areas, and it is not always the case.

Verification of the archaeological resource in the city is possible with a very intensive monitoring of all activities and investment connected with the management. City such as Lodz, where nothing is obvious should at the stage of study determine the boundaries of areas (zones) where archaeological sites are (not necessarily registered in the AZP). Determining these zones should be supported by accurate query and asset analysis, cartographic resource for all known elements included in its composition. A cartographic and source query should be completed by all possible non-invasive archaeological research (geophysics and aerial photographs where it is possible, surface studies, monitoring of the smallest investment activities, environmental analyses). Only if on this basis the conservational guidelines concerning archaeology are introduced into the study and plans, they will be close to ideal.

As it is indicated by the example presented in the photos of *Wójtowski Młyn (Mayor's Mill)* (Fig. 7), even the areas which are rebuilt for industrial use can hide in their basements very interesting relics of the past, older than the currently existing ones by more than 100-300 years.

### 4.4. Legal dilemmas

Problems with the protection of archaeological sites arise from the duality in the statutory definition. The provisions relating to immovable monuments are applied to protection of archaeological sites. In case of monuments (defined as historical buildings) the law requires maintenance of the facility in the best possible condition (preferably through its development). But in what way should an archaeological site be developed so that it can be preserved permanently and wouldn't be vulnerable to hazards that could cause harm to its value?
In the case of archaeological sites entered in the Register of Monuments, often the only way of giving a guarantee of proper protection proceedings should be a ban on building the area up and damaging the ground structure (while maintaining the warrant of keeping lawn or meadow in this place). With this form of site protection it is very difficult to convince society of its value. Then it is necessary to share and disseminate knowledge about the site, which can be done, among others, by using modern technologies. Every other action related to site development leads to the structure damage of the ground and therefore, in most cases, to the devaluation of the site.

The situation of recorded sites is much more complicated and for them the best tool is the urban plan. And what about the situation where such plans do not exist? The law provides protection only if the objects are included in the records list and only at the stage when an investment is being planned. According to the building law it is possible to provide protection for archaeological site on the basis of the decision on land development conditions or another decision. Unfortunately, due to the AZP research methodology, only the parts of the heritage indicated in the card KESA are protected. Therefore, to protect the whole settlements, graveyards, places of production and industrial processing, not only the places of archaeological items should be protected, but also their surroundings. Archaeological protection zones serve this purpose. These zones are outlined through an analysis of the environmental conditions: landscape features, soil or a hydrographical network with taking into account transformations of the area over the time. However, the zones operate well only if urban plans are enacted.

The provisions of Law on the Protection and Preservation of Historic Monuments (Article 31) is an additional impediment of the archaeological protection implementation. They allow to conduct research, exclusively in the case if it is necessary, i.e. in the situation when an investment can lead to transforming or destroying the archaeological site. The form of the record of the Article 31 is useful only in case of recorded sites which have not been regarded as exceptional and it will be enough when they are kept well documented to maintain knowledge about them. To sum up, the protection of the archaeological legacy can take place pursuant to Article 7 of the Law on the Protection and Preservation of Historic Monuments, but it often means referring back to Article 31 of this Act.

Fig.7. The construction of former buildings on the Wójtowski Młyn (Village Mayor’s Mill) area. Photographed during archaeological research. Photo by Zbigniew Rybacki, 2008.
4.5. Planning dilemma

What are the possibilities of the heritage protection in the local urban planning documents? Study... is a legal, strategic document establishing directions of the local urban planning. Although it is not local law, it is a binding act for local planning law. Thus it seems justified to define basic rules of protection of the city archeological heritage, already at the Study... level, including archeological protection zones (at least tentatively and visually). The issue seemingly simple, in fact, such is not. Several doubts and dilemmas results from the analysis and "consumption" of the adopted and binding documents in Lodz and other Polish cities.

The ambiguity of the definition is the first dilemma which was settled above by quoting NID post. Another issue is the topicality of the Study... arrangements related to their long duration, in which archeological investigations may be carried out. It may also be related to the time between passing the Study... and the local urban planning act. It may happen that archeological research, excavations and surface research, or scientific projects, which change knowledge on the archeological heritage, is being carried out. It may lead to adding or cancelling archeological sites, decreasing or increasing the sites or even to mapping a new archeological protection zone in the local plan. It causes non-compliance between Study... arrangements and the local urban planning low and may result in lack of adoption of the local urban plan (Planning Act... 2003, Art. 15). So it is necessary to introduce general rules related to the way to determine compliance between Study... and local urban planning law as well as conditions of the derogations.

Former settlement areas, particularly prehistoric, are not always within present administrative boundaries of municipalities. Archeological heritage may be registered in one area, however, the archeological protection zone may exceed the boundaries of municipalities. A good example is the archeological site on the border between Lodz and Konstantynów Łódzki, where in Lodz area there is only the archeological protection zone. Regional conservation officer (WKZ) coordinates the consistency of the protection in the area of the region and is responsible for determination and justification of the protection zone. Similar problems of 'transition zones' are also found in local urban planning, which justifies the need to determine archeological protection zone in Study... as the documents include the entire area of the municipality.

The most difficult problem are areas, in which archeological monuments might be located. Article 19 of the Law on the Protection and Preservation of Historic Monuments states that conservation protection zone (including archeological protection zone) may be determined considering the needs of Study.... and local urban planning act, imposing restrictions, prohibitions and injunctions with a view to protect the heritage located in the area. "The literal wording of the above regulation shows it does not refer to potential localizations of archaeological sites and items" (Antoniak 2015: 2). In the opinion of lawyers, supporting the planning work in Urban Planning Office in Lodz, a planner themselves is not entitled to determine archeological protection zone if there is an archaeological site, which is not registered in AZP. However, the workshop and discussions with the invited representatives of the archaeological site, held in Lodz during the work on Study, stressed the need to strengthen and possibly to widen archeological protection zones as 'buffer zones' for archaeological sites situated there. Based on the above statement and in accordance with the law, a protection zone may comprise culture heritage located in the area, “an appropriate Provincial conservator is to show that archaeological sites and items, not under legal protection, are situated in the area; the conservator may or may not make use of AZP. Conservator’s decision is an expert decision.” (Antoniak 2015: 3). [Note 7]

As a result of joint arrangements, Regional Office Protection of Heritage in Lodz (co-author of the article, Magdalena Nowak) pointed areas of archaeological sites, still not under legal protection, to the team working on the Study... (as the protection zones). It took on preparation of the needed justification of the approved location zones. Based on the arrangement, the archeological protection zones have been reintroduced into the document and we can only hope that the record will be maintained and adopted (Fig. 8).
As for the determining of local urban planning law, in contrast to the Study..., after the adoption of the plan by the municipal council and after the passage of time required in the regulation from the date of publication of the document in the Regional Official Journal – the plan becomes local law. Hence the need to formulate its findings accurately, based on the “letter of the law” and with justifications for the adopted solutions. The provisions of the plan may refer to the separate regulations for the protection of monuments, but do not duplicate them or, for e.g. result from the proposals for the plan sent from WKZ at the beginning of the procedure. The local urban plan should obligatorily specify rules for the protection of monuments (which also means recorded archaeological sites).

Archaeological protection zones may be used as a special kind of protection and conservation zones, in which during the process of planning: restrictions, orders and bans are established. Now, in Lodz local plans, protection of archaeological monuments is based on individual zones determined each time. Primarily, archaeological supervision is established, as a kind of archaeological research based on observation and analysis of stratifications discovered in earthwork on building sites or other works, which undermine the structure of the soil.

Fig. 8. Proposal of protection archaeological zones in project of Study of the conditions and development approaches of Lodz urban planning. Drawn by Miłosz Łukomski, 2016.
The need to justify the adopted conclusions in urban planning documents must be highlighted, it is particularly important if they violate property rights. It is crucial for urban plans of both Study… and local urban planning law. Arrangements and justification of archaeological protection zones included in Lodz Study… project are an effect of the model co-operation of urban planning services and regional conservation authority.

5. CONCLUSIONS

Archaeological landscape of Lodz is difficult to define, reconstruct and identify. It is not as spectacular as the archaeological scenery of other cities. Krakow, Poznan, Wroclaw cannot constitute a point of reference and their urban planning documents records cannot be regarded as a model for such not obvious cities as Lodz. This does not mean, however, that Lodz is a city without archaeology.

Identification and protection of the archaeological heritage is therefore a multifaceted task, which should be implemented not only by conservators and archaeologists, but also by universities, research centres and institutes, cultural institutions, planning services and others.

In this paper, we present the cooperation between employees of the Regional Office of the Monuments Protection and the Municipal Urban Planning Office in Lodz. The creation of the city archaeological landscape or tracking archaeology in the landscape will be possible thanks to methods and principles worked out together. It took a lot of time to develop them, but they are based on a number of consultations and discussions. Whether they will be successful, time will tell.
NOTES
[1] Since the first version of act the recommendations of the European Convention on Archaeology in La Valetta have been introduced, (Dz.u. nr 165 poz. 1568 z 2003 r.).
[2] The architecture of Łagiewniki Chapels dates back to the turn of the seventeenth and eighteenth centuries. Studies have shown, that their locations has much older roots.
[4] The quoted recommendation refers to the historic urban landscape, but per analogiam it is possible to understand in the broader meaning some of its regulations and also apply to other cultural landscapes, e. g. historic rural landscapes.
[5] Recently the procedure of crossing out from the Registry of Monuments the last of the mentioned archeological sites in Mickiewicz Park has started.
[6] At the time the expressions resulting from the archaeological tradition were used. They were not the legal definitions. That is why in the AZP there is archaeological site term.
[7] Quoted legal expertise was largely based on valid judgements of courts.
[8] Photography 9, sources of particular shots:

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